Importance of place attachment for seniors' relocation

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Preface

It is with great pleasure and a sense of accomplishment that I present this thesis, which is the culmination of years of hard work, dedication and perseverance.

First and foremost, I would like to thank my supervisors, Ioulia Ossokina, Theo Arentze and Aloys Borgers, for their invaluable guidance, support and encouragement throughout this project. Their expertise and insights shaped my research and helped me achieve my goals. I would also like to thank my family and friends, who have been a source of encouragement and inspiration. Their unwavering support and belief in me have helped me through the many challenges and obstacles I have encountered along the way. Finally, I would like to thank Maud, Nassira, Saskia, Taco and Spip, whose contributions through interviews have enriched this thesis. Their insights and perspectives added depth and value to my research, and I am grateful for their participation.

Summary

Motivation

In the Netherlands, a large number of seniors (about 140,000 out of 2.2 million 65-plus households) live in homes that are not suitable for their needs or require expensive modifications (costing around €10,000 per house). Housing associations own approximately 65% of these homes (Daalhuizen et al., 2019). While relocation is the best solution for seniors living in such homes, a relatively small number of seniors choose to relocate (Kooiman, 2020). The Ministry of Housing and Spatial Planning (2022) reports that seniors are often attached to their homes, neighbourhoods, and people in the neighbourhood, which can create barriers to relocation. This is also supported in scientific literature, as Han & Kim (2017) found that 60% of 55-65-year-olds in Australia show a strong preference to stay in the neighborhood. Moreover, this percentage increases to over 70% in the age group of 75 years and older. Ossokina and Arentze (2022) found that seniors in the Netherlands are strongly reluctant to change their housing location type. The attachment is called "place attachment" and is defined as "a social-psychological process that captures one's emotional connection to their social and physical surroundings". The research gap highlights the need for further investigation into the specific factors that influence seniors' attachment to their home and neighbourhood, as well as their decision to move. Despite some previous research, there is still much to learn about seniors' preferences and attachment to a place. Therefore, more research is necessary to bridge the gap in understanding and provide valuable insights for policymakers and professionals in the field of senior housing. This study aimed to investigate the factors contributing seniors' decisions to relocate or not. This has led to the main question of this research: "To what extent does place attachment pose a barrier when seniors decide not to move to more suitable housing, and how can this barrier be overcome?". This research is expected to have societal benefits, including increased availability of suitable homes for young families, better housing options for seniors, and addressing the housing shortages. Additionally, it is expected to have also private benefits for seniors, such as reduced falls, fewer hospitalizations, less social isolation and ageing in their own neighbourhood.

Methods and conceptual framework

The research methodology comprises four components: 1) a literature review, 2) interviews, 3) a Stated Choice Experiment, and (4) an application.

The literature review aimed to understand the meaning of place attachment in the literature by utilizing Scannel & Gifford's (2010) conceptual model (see Figure 1). The review also identified house characteristics, neighborhood characteristics, and habits that determine place attachment and reluctance to move (barriers) and stimulate (push) and attract (pull) seniors to a new home.

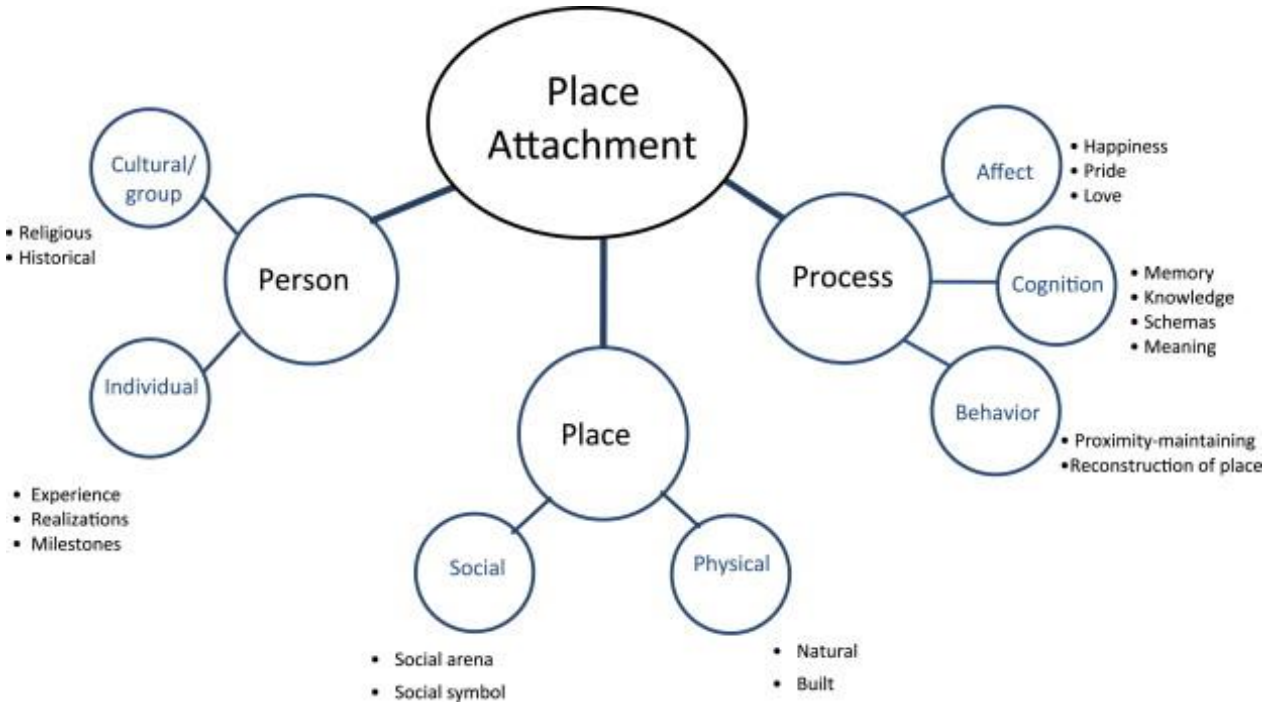

Figure 1: Place attachment (Scannell & Gifford, 2010)

Next, to verify the presence of the factors identified in the literature review, five experts were interviewed. An overview of the organization, type of organization, and job title is provided in Table 1. Based on the literature review and interviews, an overview of all the factors was compiled.

Table 1: Respondents interviews

Respondent	Organization	Type of organisation	Job title
Respondent 1	Woonstad Rotterdam	Housing association	Housing consultant Rotterdam-South
Respondent 2	Vidomes	Housing association	Senior real estate agent
Respondent 3	Woonstad Rotterdam	Housing association	Housing consultant Rotterdam-centre
Respondent 4	Havensteder	Housing association	Housing consultant
Respondent 5	Acantus	Housing association	Policy advisor Strategy and Communications

Subsequently, a Stated Choice Experiment (SCE) was conducted and the SCE aimed to identify the attributes that seniors consider important or less important when choosing a new home. This information could potentially be used by housing corporations to influence seniors' willingness to relocate. Finally, an application was developed. This application gives insights in how to interpret the MNL results, designed for housing associations.

Results

The literature review revealed that a senior-friendly neighbourhood consists of a physically walkable environment, functional facilities that are close by, and social factors such as neighborhood contacts. A senior-friendly home is one that does not require going up or down stairs and where all primary rooms are on the same living level. Interviews showed that seniors' perception of the neighbourhood depends on their physical condition and social contacts. Seniors with poor physical condition have a smaller neighborhood as they cannot walk or move far. Seniors with more social contacts have a larger neighborhood. Conversely, lonely seniors have a smaller neighborhood.

The literature review and interviews identified physical and social neighbourhood characteristics, daily routines such as shopping habits, and housing costs as the main factors that influence place attachment and reluctance to move. Physical factors include accessibility to public transport/facilities, walkability of the neighbourhood, and green surroundings. Social factors include having a social network in the neighbourhood, children living nearby, or being able to identify with the neighbourhood's identity.

The literature review and interviews identified that the factors that encourage seniors to relocate are daily activities such as house and garden maintenance, shopping, and home design (stairs), while the factors that attract seniors relate to physical and social characteristics of the neighbourhood and features of the house. Physical characteristics of the neighbourhood that attract seniors include a green, walkable living environment, and amenities. Social features that attract seniors include living closer to children or friends, social activities, and identity. Housing characteristics that attract seniors include a relocation subsidy, turnkey house, relocation subsidy, and housing costs remaining the same.

The results of the Stated Choice Experiment revealed that seniors with owner-occupied housing consider (1) a green walking route most important, followed by 2) energy-efficient homes, 3) housing costs, 4) location of the house staying the same, 5) financial compensation, and 6) daily amenities nearby. The results of the Stated Choice Experiment revealed that seniors renting social housing consider (1) financial compensation as most important, followed by (2) housing costs, 3) location of the house staying the same, (4) energy-efficient homes, (5) green walking route and (6) daily amenities nearby. For the rental variant, housing association Vidomes distributed the experiment to around 500 respondents on their behalf. In addition, social media platforms such as Facebook and LinkedIn were used to send the experiment to social-rental tenants and for the owner-occupied sample. A total of 135 people fully completed the survey (88 owner-occupied and 47 rental). It should be noted that the sample size of the rental sector was too small and therefore not representative. Therefore, it was chosen to include seniors with owner-occupied houses to increase the number of respondents.

Finally, in the application 5 relocation packages were developed based on commonly used programs, such as VGNB (a relocation program), Ouderen Hub (a senior hub), and "Langer Thuis Wonen + Ontwerpen" (longer living at home and designing for seniors). The application developed in this study demonstrated that relocation packages can impact the barrier of place attachment by employing a combination of attributes. For instance, offering a combination of financial incentives and green walking routes increases the probability of seniors relocating, although this does not guarantee that they will actually move. Nonetheless, such a combination of factors increases the willingness to relocate among seniors, which could potentially stimulate a relocation movement.

Conclusion and discussion

This study highlights that seniors' willingness to relocate depends on various factors such as housing, living environment, and facilities, and the failure to meet seniors' requirements reduces their willingness to relocate. The study suggests that combining different factors can increase seniors' willingness to relocate. The location of a new living environment alone is not enough to encourage relocation and providing a relocation subsidy and / or living cost remaining the same can increase seniors' willingness to relocate.

However, this study has some limitations such as the lack of no focus group discussions with seniors, not all the attributes used in the experiment being based on place attachment and the heterogeneity of the data. Firstly, no focus group discussions were conducted with seniors, despite the initial intention to do so. This was due to difficulties in finding participants. As a result, the study lacked sufficient insights into the characteristics that seniors find important. Secondly, the attributes used in the study were not all related to the study of place attachment. For example, the energy attribute was not relevant to this research, and social aspects were not adequately reflected. This was a limitation, as better insights could have been gained for the barrier of place attachment if the attributes were based solely on this study. Finally, the heterogeneity of the collected data was a limitation. The study aimed to reach seniors who rent in the social sector and talks were held with 8 housing associations and 1 property developer, but 7 housing associations and the property developer dropped out, making it difficult to reach the intended target group. To overcome time constraints, seniors with owner-occupied houses were included in the study, potentially leading to different insights than if the survey had been conducted among only social tenants. Additionally, the data showed that a large proportion of participants were aged 55-65, married couples, Dutch, and in good physical condition. A more diverse target group could have led to different insights. Based on the above limitations, it is therefore recommended that future research should conduct a stated choice experiment on only factors that have a relationship with place attachment. Here, for example, attributes such as living closer to children or relatives, social activities and identity of environment could be investigated. This would allow to give a better advice on which aspects have more influence on place attachment.

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Glossary

Table 2: Glossary

Term	Definitions
Aging in place	The ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level.
Barrier	An attachment to home, neighbourhood and people in the neighbourhood that makes seniors reluctant to relocate.
Healthy aging	The process of developing and maintaining the functional capabilities that enable well-being in old age.
Neighbourhood	An urban residential area that is typically small enough to be covered easily on foot. It is sometimes assumed that neighborhoods are also communities defined by social interaction or geographical boundaries such as major roads, parks, or rivers, but this is not always the case.
Neighborhood cohesion	The state or disposition of the collective - i.e., the residential togetherness experienced by residents - visible in the interrelation of attitudes and practices concerning attachment, neighborhood relations, and commitment to the local common good.
Place attachment	The social-psychological process that captures one's emotional connection to his or her social and physical surroundings.
Place	Based on Scannell and Gifford (2021): the social and physical place to which one connects.
Person	Based on Scannell and Gifford (2021): the individual or a group attachment to a place.
Private benefits	The benefits seniors themselves can achieve from relocation.
Process	Based on Scannell and Gifford (2021): the way individuals and groups relate to a place, and the nature of the psychological interactions that take place in the environments important to them.
Sense of place	The meanings and emotions associated with a place that are derived from the individual's experience and understanding of that place.
Seniors	55 years and older.
Societal benefits	The benefits that the society can experience from seniors' relocation.
Senior-friendly home	A home where seniors do not have to navigate stairs and where all primary rooms are located on the same level.

1. Introduction

Chapter 1 starts with an introduction to the topic of place attachment as a reason for not relocating. Based on the introduction, a research gap is formulated. Subsequently, main and sub-questions are formulated. Chapter 1 concludes with the societal and academic relevance of this research.

1.1. Ageing & policy

The world's population is aging, and as a result, the proportion of seniors in the total population is expected to increase. According to the World Health Organization (WHO) (2011), the number of people aged 60 and over will nearly double from 12% to 22% between 2015 and 2050, due to improved health, wealth, and education of future seniors (Patterson, 2002).

The WHO's focus is on healthy aging (WHO, 2021), which they define as "the process of developing and maintaining the functional capabilities that enable well-being in old age". In their 2015 report, "Report on Ageing and Health," the WHO discussed healthy aging, among other topics (WHO, 2015). In addition, the World Health Assembly (2017) released the action plan "The global strategy and action plan on ageing and health 2016-2020: towards a world in which everyone can live a long and healthy life," which aims to create a world where everyone can live a long and healthy life.

In 2012, the Employment Committee and the Social Protection Committee, which are advisory policy committees of the European Union (EU), worked together to develop the Principles for Active Aging (Council of the European Union, 2012). The principles include employment, participation in society, and independent living. In addition, the Age-friendly Environments in Europe (AFEE) project aims to create tools that will enable local and regional authorities to make strong commitments to becoming more age-friendly (WHO, n.d.).

The Dutch government encourages seniors to age independently in their homes (Rijksoverheid, 2021). Aging in place can be defined as "the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level" (CDC, 2019). According to Lager (2015), this allows seniors to boost their well-being. The Dutch government has made 340 million euros available for the implementation of the "longer living at home" program, which aims to better support care at home, help informal caregivers and volunteers, and provide more suitable housing for seniors (Ministry of Health, Welfare and Sport, 2020). Additionally, the government has an innovation program called "Inclusive Neighbourhood," which investigates what makes a supportive, social, and physical living environment for seniors.

In conclusion, facilitating independent aging will be one of the societal challenges for the world, Europe, and the Netherlands.

1.2. Place attachment as a reason not to move

In the Netherlands in 2015, around 140,000 seniors, out of a total of approximately 2.2 million 65-plus households, lived in houses that could not be adapted to meet their needs, or for which the cost of adaptation was relatively high (around €10,000). According to Daalhuizen et al. (2019), 65% of these homes belong to housing associations. For seniors living in such homes, relocation may be the best solution.

However, only a small percentage of seniors actually choose to relocate (Kooiman, 2020). According to the Ministry of Housing and Spatial Planning (2022), seniors do not want to relocate because of their attachment to their home, neighbourhood, and people in the neighbourhood. This is supported by Van Beuningen & Molnar (2020), who found that more than 80% of seniors are attached to their homes and/or neighbourhoods. In the literature, the bond between people and their particular places is referred to as "place attachment" (Altman and Low, 1992; Giuliani and Feldman, 1993). Han & Kim (2016) identified four groups of seniors based on their attachment to home or neighbourhood, as shown in figure 2. A weak preference for the neighborhood and a weak preference for a house allow for various possibilities of relocation. A strong preference for the neighborhood but a weak preference for the home will lead to a preference to age in the neighborhood or a short-distance relocation. The authors suggest that strong place attachment may have negative consequences. A weak preference for the neighbourhood but a strong preference for the home may lead to social isolation and related problems. Seniors face obstacles such as unsuitable housing layout (e.g., thresholds), difficult access to and/or in their homes (stairs), unsuitable location of the home (poor public transportation), and home maintenance due to their attachment to their home.

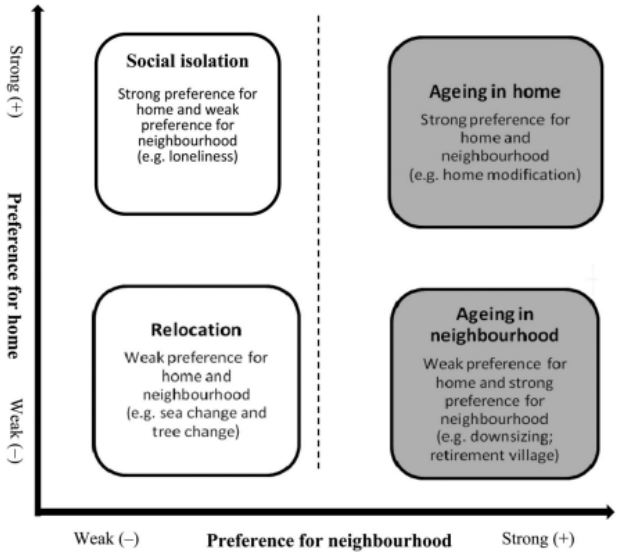


Figure 2: mobility intentions (Han & Kim, 2017)

Han & Kim (2017) found that 60% of 55-65-year-olds in Australia show a strong preference to stay in the neighborhood. Moreover, this percentage increases to over 70% in the age group of 75 years and older. This is supported by research from the American Association of Retired Persons (AARP), which found that approximately 75% of those over 50 want to stay in their current home or community for as long as possible. Moreover, if seniors were to consider moving, 78% wanted the same type of community (Joanne, 2021). Ossokina and Arentze (2022) found that seniors in the Netherlands are strongly reluctant to change their housing location type. Place attachment is thus a barrier when seniors consider relocating to a suitable living environment.

In summary, many seniors in the Netherlands live in homes that cannot be adapted to their needs or are relatively costly to modify. Although relocation may be the best solution for some, only a small percentage of seniors choose to move due to their strong attachment to their home and neighborhood. Place attachment, or the bonding between people and their particular places, can act as a significant barrier to

seniors considering relocation to a more suitable living environment. This research highlights the importance of understanding the factors that determine the strength of seniors' preference for their home and neighborhood, in order to develop effective policies and strategies to address their housing needs and preferences.

1.3. Research gap

There has been limited research on the specific factors that influence seniors' attachment to their homes and neighborhoods, and their decision to relocate. Brown et al. (2003) conducted a study on place attachment to homes and neighborhoods among more than 600 residents, and found that overall attachment to place was higher among homeowners with higher sense of neighbourhood cohesion. Méndez et al. (2021) defined neighborhood cohesion as "the state or disposition of the collective - i.e., the residential togetherness experienced by residents - visible in the interrelation of attitudes and practices concerning attachment, neighborhood relations, and commitment to the local common good". Bailey et al. (2012) found that place attachment was lower in underdeveloped neighborhoods due to weaker cohesion. Clark et al. (2015) found in their research on place attachment and the decision to stay in neighbourhoods in Granada, Spain. that family ties, neighborhood attachment, and satisfaction were associated with seniors not moving, and that seniors relocated less often than young people. Hansen & Gottschalk (2007) used a Multivariate Logistic Regression to investigate the drivers of senior relocation, and found that life changes and housing dissatisfaction influenced the decision to relocate. Ailshire et al. (2018) surveyed US older adults and found that seniors with physical limitations were more likely to move to improve their living environment. De Jong (2020) investigated migration in later life and found that mobility among seniors was influenced by factors related to housing, and the degree of social cohesion played a role in explaining seniors' propensity to move.

However, there is still a need for more research on the factors influencing seniors' place attachment and their decision to move. De Jong et al. (2022) investigated the housing choice behavior of Dutch seniors and found that a neighborhood with a mix of single-person households, families, and seniors is preferred. Ossokina et al. (2019) conducted a stated choice experiment to determine seniors' housing preferences, and used the results to design an architectural design of senior-friendly housing. So there are studies that have focused on seniors' preferences. But what exactly makes seniors want to stay in their own neighbourhood or push them out? Are these social or physical characteristics? What is the definition of neighbourhood? These are aspects that have not been studied by others. This study focuses on the housing preferences of seniors with regard to place attachment. Therefore, this study aims to dig deeper into housing preferences with regard to the factors of place attachment for seniors.

1.4. Main and sub-questions

Based on the research gap, this leads to the following main question:

To what extent does place attachment pose a barrier when seniors decide not to move, and how can this barrier be overcome?

In order to address the main research question, the following set of sub-questions needs to be answered:

1. What is the relevant size of the neighbourhood as perceived by the seniors as related to place attachment?
2. Which house, neighbourhood characteristics and/ or habits determine place attachment and reluctance to move?
3. Which house, neighbourhood characteristics and/ or habits determine place attachment and can stimulate and attract seniors to move?
4. What factors of place attachment do seniors prefer when relocating to a new home?
5. What attributes (and attribute levels) should be prioritized by housing associations to reduce the barrier of place attachment among seniors, and thereby increase their willingness to move to a new location?

1.5. Societal relevance

This research aims to provide a better understanding of the determinants that contribute to seniors' decision to relocate or not, despite their attachment to their current place of living, while also identifying potential societal and personal benefits seniors may experience from moving. Currently, there is a shortage of nearly 279,000 homes, which is about 3.5% of the housing stock (Capital Value, 2022) According to Den Haan (2021), more housing should be built for seniors, which could create flow in the housing market. This would allow seniors to move into senior housing, while their single-family homes become available for families. Seniors living in senior housing fall less often and may reduce hospitalizations (Daalhuizen, 2019). Senior-friendly homes and neighborhoods also reduce social isolation (Han & Kim, 2017). Moreover, seniors are able to age in their own neighborhoods, which has economic and social value (Pavolini & Ranci, 2008; Lui et al., 2009). Moreover, it can provide property developers, municipalities and housing associations insight into the development of housing locations for seniors. Finally, it saves money for residents, municipalities and housing associations as well as no modification of housing is required. The societal benefits of providing suitable housing for seniors are that it would be a better match with seniors needs, that single-family homes would go to families, and that it would help tackle the housing shortage. The private benefits for seniors include falling less often, reducing hospitalizations, feeling less socially isolated, and aging in their own neighborhood.

1.6. Academic relevance

This research will provide a better understanding of the factors that contribute to overcoming the barrier of place attachment, in the choice for the seniors to relocate or not to. Understanding these preferences will expand the existing literature. There are not many studies that have focused on the various factors of place attachment that pose a barrier to seniors' relocation decision and which are important/less important. Using the stated choice experiment will expand the existing literature. The experiment will provide scientific evidence on which factors seniors consider important in a relocation decision.

1.7. Jointly written chapters

Chapters 4, 5, 6, 7, 8 and 9 in this theses were co-authored with fellow student Jurien van Arum. The reasons for this decision are: 1) the two studies are similar in terms of understanding seniors' preferences to move to another home. This study focuses on "place attachment" and the second study by Van Arum focuses on the role of "best practice" in relation to relocating and 2) a stated choice experiment (SCE) was conducted together to increase the practicality of obtaining valuable information from different housing associations.

2. Literature study & conceptual framework

The first step in Chapter 2 is to ground this research in a description of the housing shortage in the social sector and how housing associations have tried to respond to it. The relocation of seniors can trigger a flow and overcoming place attachment can contribute to this, showing the importance of this research. After clarifications, the needs of seniors are discussed and a definition of housing and living environment is then established based on the needs of seniors. Next, a conceptual framework about place attachment used in this study is presented. The factors that determine place attachment are then described using push, barrier and pull factors. The chapter ends with a conclusion.

2.1. Housing shortage housing associations

Providing suitable and affordable housing to lower-income tenants is the main responsibility of housing associations, as stated by the Ministry of the Interior and Kingdom Relations (2021). However, the shortage of social housing has been increased by various factors, including the landlords' tax and amendments to housing law in 2015 (Ministry of the Interior and Kingdom Relations, 2021; Aedes, n.d.). Starting from 2013, housing associations have been paying tax on social rental housing, which has limited their resources for building new homes. Furthermore, the Housing Act amendment in 2015 required housing associations to prioritize their primary task, leading to a reduction in the construction of social housing and a subsequent increase in the social housing shortage. Presently, the shortage of housing stands at around 279,000 homes (Capital Value, 2022) and is there also a scarcity of social rental housing for seniors. The government plans to address this issue by adding 1 million homes by 2030, with half of them allocated for seniors (ABN-AMRO, 2022).

Figure 3 displays a relocation chain, indicating that the flow of seniors may lead to up to three relocations in the chain. The first relocation involves a senior moving from a single-family home to a senior-friendly home (3). The second relocation may involve a family moving from a studio to the senior's single-family home (2), and consequently, the studio becomes vacant again, which can be occupied by a student (1).

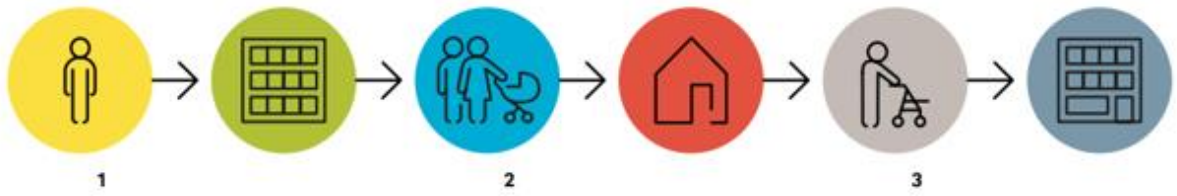


Figure 3: Relocation chain (Bluemink et al.,2021)

In order to facilitate the flow of seniors into more suitable homes, housing associations have implemented relocation programs such as "Van Groot naar Beter" (VGNB). This program allows seniors leaving a larger home (three rooms or more) to move into a more suitable home. Participants are be able to maintain their current rent or receive a relocation subsidy (Bluemink et al., 2021). However, the data shows that only around 5% of seniors relocate on an annual basis (CBS, n.d.). Therefore, the following section will take a closer look at the specific needs and preferences of seniors.

2.2. Housing and community needs in third stage

According to Laslett (1987) and Laslett (1991), human life can be divided into four stages: the first, second, third, and fourth. The first stage is characterized by dependence, socialization, and learning, while the second stage is marked by independence, maturity, responsibility, and work. The third stage is the stage of life after a long period of working, where personal accomplishment after retirement and fulfilment are the main characteristics. However, physical and cognitive decline often appear during this stage due to ageing. Finally, the fourth stage is characterized by ultimate dependence, decline, and death. This study focuses on the third stage.

Retirement, comfort, and care are identified by Litwak and Longino (1987) as the three motivations for mobility in the third and fourth stage. The first motivation for relocation is related to the living environment after retirement. The second motivation is related to comfort, where the senior moves closer to informal carers when their health deteriorates. These could be children, for example. The last motivation is for care and arises when the family can no longer care for the senior at home. Based on these motivations, mobility can be categorized into two types: forced and voluntary. Forced mobility is due to deteriorating health, while voluntary mobility is often related to seeking better living conditions. This study focuses on voluntary mobility in the third stage of life.

Specific housing needs and the neighbourhood are crucial for the residential mobility of third-age seniors (Angelini & Laferrere, 2012). It is critical that the neighbourhood supports seniors' needs, as their social networks tend to shrink and mobility decreases with age (McPherson et al., 2006; Oh & Kim, 2009; Phillips et al., 2005). Arentze and Ossokina (2020) described that seniors' housing needs include comfort, accessibility, safety, a preference for smaller living spaces and facilities to be with others.

This section has established that seniors have specific neighbourhood and housing needs. Therefore, a detailed definition of a senior-friendly home and neighbourhood will be provided in the next section.

2.3. Senior friendly neighbourhood and house

According to Castree et al. (2013), a neighborhood can be defined as ''an urban residential area that is typically small enough to be covered easily on foot. It is sometimes assumed that neighborhoods are also communities defined by social interaction or geographical boundaries such as major roads, parks, or rivers, but this is not always the case. The degree to which inhabitants identify with the area or interact with others is an empirical question''. Based on this definition, it can be concluded that it is therefore an urban area that can be travelled by walking. Walking can be beneficial to the seniors because physical activity can lead to improvements in body balance, strength, and mental health, among other things (Zhai, 2018). Additionally, it can lead to social interaction (Helliwell & Putnam, 2004). In this study, this definition will be adhered to. The exact size of the neighbourhood as perceived by the seniors is an empirical question that will be addressed.

A senior-friendly neighborhood consists of a physically walkable environment, facilities in close proximity, and social factors such as neighborhood contacts (Daalhuizen, 2019). The suitability of the social and functional environment ensures that seniors can continue to live independently at home. As seniors age, their range and number of trips decrease, which leads to a smaller network due to the limited action radius of seniors. This can result in greater isolation as seniors become more dependent on the people/contacts in their environment. Moreover, seniors often spend more time in their neighborhood as they are no

longer employed and their declining mobility and health limit their ability to engage in demanding activities outside their home. Therefore, the neighbourhood is more important for the well-being of seniors than for the young and working population (Buffalo et al., 2012). A senior-friendly home is defined as one where seniors do not have to climb stairs and where all primary rooms are located on the same level (Daalhuizen et al., 2019). It is also referred to as zero-entry housing, as it is suitable for seniors with physical disabilities or chronic illnesses.

Therefore, it can be concluded that a senior-friendly living environment comprises of a physically walkable environment, a functional environment with amenities in close proximity, and social factors such as neighborhood contacts. A senior-friendly home should meet the criteria of being all rooms on a single living level without the need for climbing stairs.

2.4. Conceptual framework

The Netherlands currently has nearly 8 million households, of which 3.73 million are households of people aged 55 or older. According to data from CBS (n.d.), seniors tend to relocate at a rate of only 5% per year. The Ministry of Housing and Spatial Planning (2022) states that seniors are often attached to their home, neighborhood, and the people in the neighborhood, which is why they may be reluctant to relocate.

Place attachment, as described by Brown et al. (2003), is "a social-psychological process that captures one's emotional connection to his or her social and physical surroundings." It refers to the emotional connection that an individual has with their social and physical surroundings. Place attachment may vary in strength and can differ between individuals and places. Shamai (1991) argued that place attachment, fall under the umbrella term 'sense of place'. Jorgensen & Stedman (2006) define sense of place as "the meanings and emotions associated with a place that are derived from the individual's experience and understanding of that place." Deutsch & Goulias (2010) further elaborate on sense of place as a multidimensional concept that includes physical, cognitive, emotional, and social dimensions.

Scannell and Gifford (2010) have developed a framework on place attachment (see Figure 4). The authors propose that place attachment consists of three aspects: process, place, and person, which will be discussed in the following subheadings.

2.4.1. Process

Process is the aspect that can be defined, according to Scannell & Gifford (2010), as "the way individuals and groups relate to a place, and the nature of the psychological interactions that take place in the environments important to them" and is characterized by affect, cognition, and behaviour components. The first component is affect, which is the emotional connection to a particular place. This component can be described as the range of emotions that people feel towards a particular place, which can include love, contentment, fear, hatred, and ambivalence (Manzo, 2005). The second component is cognitive, which can be described as the memories, beliefs, meanings, and knowledge that people associate with their environment. This is developed through memory and allows people to create meaning with a place and connect it to themselves. Finally, the last component is behavior, which is described as "a positive affective bond between a person and a place." This may involve maintaining daily routines or engaging in activities that foster a sense of connection with a place (Hidalgo & Hernández, 2001).

2.4.2. Place

Place can be defined as "the social and physical characteristics of attachment to which one connects" and can be divided into social and physical dimensions (Scannell & Gifford, 2010). Hidalgo & Hernandez (2001) found that the social dimension of place attachment was stronger than the physical dimension. However, both aspects influence overall attachment. This is because people are attached to places that facilitate social relationships and group identity (Scannell & Gifford, 2010). Urban sociologists also believe that attachment to a place is primarily social (Hunter, 1978; Kasarda & Janowitz, 1974; Gans, 1963). Nonetheless, both dimensions contribute to place attachment. The physical dimension is central to attachment because it provides amenities or resources to support one's goals (Stokols & Shumaker, 1981). The types of places that individuals find meaningful represent a wide range of physical environments, such as houses, streets, or parks (Manzo, 2005; Manzo, 2003).

2.4.3. Person

Person can be defined as "the individual or a group attachment to a place" and consists of two dimensions: individual and cultural/group (Scannell & Gifford,2010). Place attachment is stronger at the individual level when a person has for example lower living costs, according to Clark and Dieleman (1996). Place attachment can occur at the group level and encompass different cultures, genders, and religions. The rest of the factors of person will be discussed in section 2.5.3.

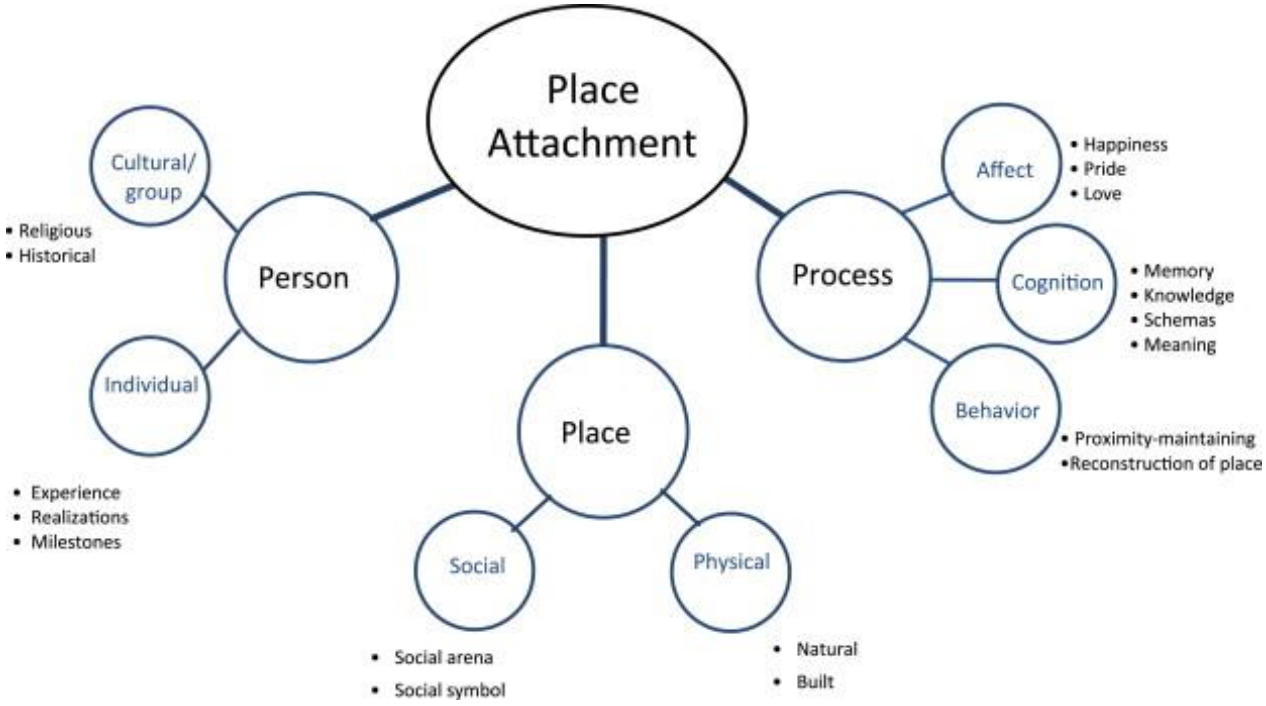


Figure 4: Place attachment (Scannell & Gifford, 2010)

2.4.1. Sub conclusion

In conclusion, it can be stated that place attachment is a social-psychological process that encompasses an individual's emotional connection to their social and physical environment. Scannell and Gifford (2010) identify three key aspects of place attachment: person, place, and process. Process refers to the way in which individuals and groups relate to a particular place and the psychological interactions that occur within that environment (Scannell & Gifford, 2010). Place, on the other hand, can be defined as the social

and physical characteristics of a location to which individuals feel attached (Scannell & Gifford, 2010). Finally, person can be defined as an individual's or group's attachment to a specific place (Scannell & Gifford, 2010).

2.5. Push, barrier and pull factors determining place attachment

Only a relatively small share of seniors relocate (Kooiman, 2020) and one of the reasons is because seniors are attached to the home, the neighbourhood and the people in the neighbourhood (Ministry of Housing and Spatial Planning, 2022).

Seniors' decision to move or stay can be identified with push, barriers and pull factors (Figure 5) (Buys et al.,2014) and will be used to analyse place attachment factors. A push factor is a factor that makes senior decide to move themselves. This can include, for example, the decline in mobility. Barriers are factors that make one stay in the current place. These are thus thresholds that can make the user not want to move. Pull factors, are factors that make it attractive for the seniors to move. Hereby one can think of living closer to facilities. However, there are barriers between these two factors that need to be considered when studying place attachment in relation to senior relocation. Some factors may be subject to debate as to whether or not they are related to place attachment, yet still have an impact on seniors' decision to move and will therefore be included in this study. An example of such a factor is public transportation. When seniors contemplate relocation, they engage in a process of weighing the pros and cons of their current and prospective locations. This is not directly related to attachment to a place, as the focus is on determining which location is better, and thus such factors will be categorized as barriers. Additionally, it is possible that certain factors may overlap. For instance, public transport may attract seniors to a new location, but at the same time, it can also act as a barrier that deters seniors from relocating. Thus, this factor can simultaneously act as both a barrier and a pull factor.

In the next section the conceptual model of Scannell and Gifford will be used to analyse the push, barrier and pull factors for place attachment. This will be done by investigating factors for the three aspects of process, place and person.

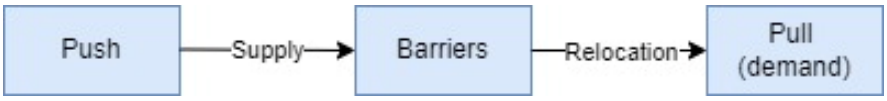


Figure 5: Push, barriers and pull (Buys et al.,2014)

2.5.1. Process

Push

The attachment of seniors to a place weakens when seniors have to perform garden and home maintenance activities, as aging is associated with a decline in physical, cognitive, and mental health (Lauwers, 2017). This decline can lead to a greater willingness to relocate, as performing such tasks becomes more challenging. According to CBS (2015), seniors experience problems with mobility and self-care, which can be difficulties as in moving around and carrying out daily activities such as preparing meals and housework. Seniors may have problems with walking, lifting, bending or picking up. These problems are caused by factors such as back pain, joint wear and arthritis (rheumatism), among others (Boldy et al., 2010; Groger & Kinney, 2006; Stimson & McCrea, 2004; Bekhet et al., 2009).

The attachment of seniors to a place can also be weakened by their ability to perform Activities of Daily Living (IADLs) such as grocery shopping and transportation, as these are complex activities related to their ability to live independently in the community (CBS, 2015). This can lead to a greater willingness to relocate. Daalhuizen et al. (2019) suggest that the functional environment contributes to the independence of seniors. Figure 6 shows that seniors may experience difficulties in shopping and moving outside the home, which is also supported by Chudyk et al. (2017) who describe the challenges that seniors in wheelchairs face when grocery shopping.

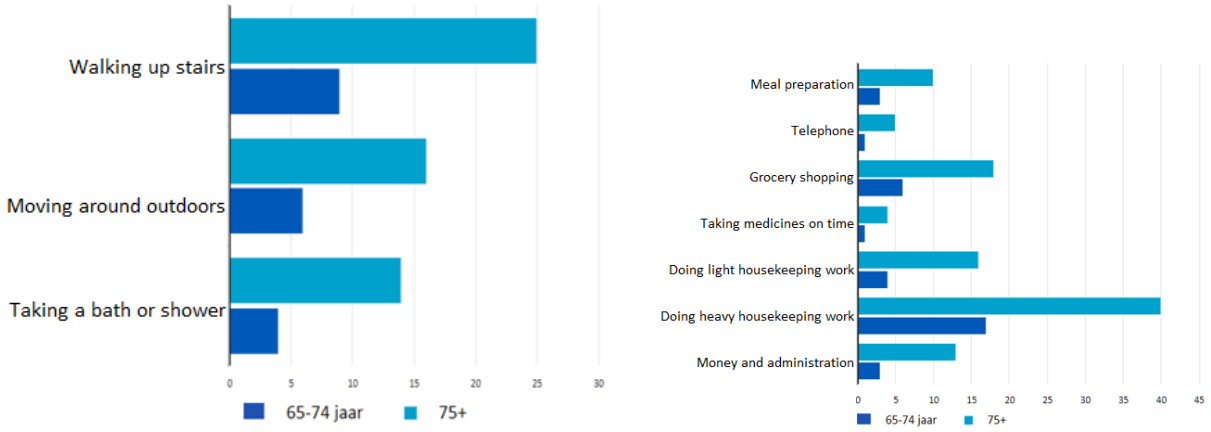


Figure 6: Problems with daily activity (CBS,2015)

Barrier

Place attachment is strengthened by the feeling of safety in the environment of seniors (Boldy et al., 2010; Aliakbarzadeh Arani et al., 2021), which could lead to a decreased willingness to relocate. Buffel et al. (2014) found that in neighborhoods with higher levels of place attachment, a higher percentage of people felt comfortable leaving their homes after sunset.

Accessibility of facilities also strengthens place attachment for seniors (Boldy et al., 2010; Aliakbarzadeh Arani et al., 2021) and could lead to a decreased willingness to relocate. This is supported by Daalhuizen et al. (2019), who found that good accessibility ensures that seniors are able to continue living independently. In addition, according to a study by Turcotte and Schellenberg (2006), seniors' place attachment can be increased by good accessibility to public transport. This is because having access to public transportation allows seniors to easily move around their neighborhood and visit friends who live further away.

The length of time a person has lived in the same place also strengthens place attachment (Roy et al., 2018) and could lead to a decreased willingness to relocate. This may be because the longer seniors live in a place, the more attached they become to their home and surroundings. Additionally, familiarity with the neighborhood increase their place attachment.

Finally, daily routines strengthen place attachment (Roy et al., 2018) and could lead to a decreased willingness to relocate. Seniors may find it challenging to leave a place due to the disruption of their established routines.

Pull

The proximity of amenities has been found to be a factor in attracting seniors to new locations, as it makes it easier for seniors to continue living independently (Boldy et al., 2010; Stimson & McCrea; Tyvimaa & Kemp, 2011; Costlow et al., 2020). According to Daalhuizen et al. (2019), a functionally acceptable living environment for seniors should have primary amenities, such as a family doctor, pharmacy, and supermarket, within a 500-meter radius of their house. Additionally, seniors who are considering relocating also prioritize proximity to health and medical services (Boldy et al., 2010). Turcotte and Schellenberg (2006) confirm this finding by stating that access to health centers is particularly important for seniors, as they require them more frequently than younger individuals.

2.5.2. Place

Push

Social isolation and loneliness have been found to weaken place attachment, which may increase seniors' willingness to relocate (Tyvimaa & Kemp, 2011; Bekhet et al., 2009; Stimson & McCrea, 2004). According to CBS (2020), 24.7% of individuals aged 65 to 75 years report being somewhat lonely, while 7.8% report feeling very lonely. In the age category of 75 years and older, 32.9% report being somewhat lonely and 8.8% feel strongly lonely. This may be attributed to the fact that seniors are no longer working and have lost social contacts in their environment, such as their partner (Ministry of Health, Welfare and Sport, 2018). Loneliness has been linked to various negative health outcomes, such as dementia, premature death, and heart problems, and can create a vicious cycle where individuals withdraw further, leading to increased loneliness (Ministry of Health, Welfare and Sport, 2018).

The design of the house can also weaken place attachment and increase seniors' willingness to relocate (Stimson & McCrea, 2004; Tyvimaa & Kemp, 2011). For instance, seniors may have difficulty accessing bathrooms on another floor of the house (Stimson & McCrea, 2004; Tyvimaa & Kemp, 2011), which could limit their mobility and lead to a reduced sense of attachment to their home. Additionally, this can lead to other limitations, such as the inability to access other floors of the house.

Barrier

Place attachment can be strengthened by the presence of people in the neighborhood, neighborhood integration, and good neighbors (Boldy et al., 2010; Clark et al., 2015; Aliakbarzadeh Arani et al., 2021), and this may lead to a reduced willingness to relocate. Fischer and Malmberg (2000) have described these factors as "sunk costs," referring to the location-specific capital that residents accumulate over time and lose when they move. Seniors, who have lived in a neighborhood for a longer period, are less likely to move as they have accumulated more location-specific capital.

Having children in the neighbourhood can also strengthen seniors' place attachment and lead to a reduced willingness to relocate (Mutchler & Burr, 2003; Aliakbarzadeh Arani et al., 2021). This is because these children may have grown up in the neighborhood or live nearby, and the memories associated with the neighborhood can strengthen their attachment to it.

The walkability of the neighborhood can also strengthen place attachment (Buffel et al., 2010) and reduce the willingness to relocate. Neighborhoods with a high degree of walkability can increase seniors' independence and mobility, which may influence their decision to stay in their current location.

Pull

Social activities (Tyvimaa & Kemp, 2011; Stimson & McCrea, 2004; Baumker et al., 2011; Roy et al., 2018) can attract seniors to new locations. Seniors have indicated that social activities are the main reason for doing physical activities in groups and that social participation is an important need to prevent loneliness, giving them a sense of belonging (Lak et al., 2019). This is supported by Yung et al. (2016) who describe seniors' most important social need is interaction with others to prevent loneliness. In addition, social activities can provide seniors with daytime activities.

A social network (Roy et al., 2018) can attract seniors to new locations. According to Kemperman (2019), people with a larger social network are more likely to be satisfied with their social connections, reducing loneliness. An environment that facilitates social interaction could possibly make seniors more willing to move.

Highly walkable neighborhoods can attract seniors to new locations (Stimson & McCrea, 2004). If the built environment is supportive, it can enhance seniors' independence (Alves et al., 2020) and attract them to new locations. Van Wijk (2022) and Ossokina et al. (2022) report the importance of the accessibility of the walking route.

An apartment (Tyvimaa & Kemp, 2011; Stimson & McCrea, 2004; Tyvimaa & Kemp, 2011) can attract seniors to new locations because of its modern appliances and ease of housework (Tyvimaa & Kemp, 2011; Stimson & McCrea, 2004). Abramsson & Andersson (2015) suggest that the kitchen, bathroom, bedroom, and living room should be wheelchair accessible, reachable without the use of stairs, and with a balcony or terrace instead of a garden. This is supported by Daalhuizen et al. (2019), who describe this as zero-entry housing.

Living closer to a public transport stop (Daalhuizen et al., 2019) may attract seniors as it is of primary importance to live independently. This allows seniors to travel through the neighbourhood or visit family. According to CBS (2021), this involves buses, trains, metros or trams.

2.5.3. Person

Push

Place attachment can be weakened by education (Wu et al., 2015), which could lead to a willingness to relocate. Research conducted by Fischer & Malmberg (2001) and Clark & Dieleman (1996) has shown that higher-educated seniors are more likely to relocate. This could be attributed to the fact that higher-educated seniors tend to think more about their future.

Age and health can also weaken attachment to a place (Abramsson & Andersson, 2016; De Jong, 2020), which can lead to a willingness to move. As seniors get older, it becomes increasingly difficult to climb stairs and access amenities, reducing attachment to their home and surroundings. This, in turn, may lead to a greater willingness to move.

Barrier

Place attachment is strengthened by financial status (Weeks et al., 2012) and affordability (Stimson & McCrea, 2004), which can lead to less willingness to relocate. According to Clark & Dieleman (1996), higher living costs can result in a lower willingness to relocate. Some seniors have been living in their homes for

up to 20 years, and the rent of a new house may be higher than their current housing costs, which could decrease their willingness to relocate.

Place attachment is also strengthened by ethnicity (De Groot et al., 2008) and can lead to a lower willingness to relocate. Seniors may identify strongly with their neighborhood and feel a sense of belonging, which can increase their place attachment and decrease their willingness to relocate.

Pull

It was found that widowed and divorced seniors are more willing to relocate (Richards & Rankaduwa, 2008). This can be explained by the fact that these seniors could be lonely.

2.6. Conclusion

In summary, this chapter emphasizes there is a need for senior housing and the potential impact it can have on triggering a relocation chain. However, despite the availability of relocation programs, only a small proportion of seniors actually move. This study focuses on third-stage and voluntary mobility, highlighting the specific neighborhood and housing needs of this group. A senior-friendly neighborhood consists of a physically walkable environment, a functional environment where amenities are close and present, and social factors such as contacts in neighbourhoods, while a senior-friendly home is one where the resident does not have to go up or down stairs and where all primary rooms are at the same living level.

Additionally, this chapter reviewed the literature on place attachment. First, a conceptual framework of place attachment was presented. Then, based on the conceptual model of place attachment, the push, barrier and pull factors were identified. This definition of place attachment can be described as a social-psychological process that captures a person's emotional attachment to his or her social and physical environment.

Through the conceptual model, the push, barrier and pull factors of place attachment were investigated. The conceptual model consists of the three aspects of process, place and person. Process can be defined as "the way individuals and groups relate to a place, and the nature of psychological interactions that take place in the environments important to them". Furthermore, process is characterised by affect, cognition and behavioural components. Place can be defined as the social and physical place characteristics with which one associates and which consist of a physical and social component. Person can be defined as the individual or group attached to a place. In addition, a push factor is a factor that makes senior people decide to move themselves. Barriers are factors that make one stay in the current place. Pull factors, are factors that make it attractive for seniors to move. See table 3 for the push, barrier and pull factors that emerged from the literature review.

Table 3: Attributes based on literature study

Push	Barriers	Pull
Process		
Affect	• Safe feeling / environment (Boldy et al., 2010; Aliakbarzadeh Arani et al., 2021).	
Cognition	• Public transport (Turcotte & Schellenberg, 2006)	• Public transport (Stimson & McCrea, 2004; Tyvimaa & Kemp, 2011)
Behaviour • Instrumental Activities of Daily Living (IADLs) (Edemekong,2022) • Maintaining the house and garden (Boldy et al.,2010; Groger & kinney, 2006; Stimson & McCrea, 2004; Bekhet et al.,2009; Tyvimaa & Kemp, 2011)	• Accessibility of facilities (Boldy et al., 2010; Aliakbarzadeh Arani et al., 2021). • Length of residence (Roy et al., 2018). • Daily routines (Roy et al., 2018)	• Closer to amenities such as grocery stores, public transport and family doctor (Boldy et al.,2010; Stimson & McCrea; Tyvimaa & Kemp, 2011; Costlow et al., 2020) and health centers (Turcotte and Schellenberg, 2006)
Place		
Social • Social isolement and loneliness (Tyvimaa & Kemp, 2011; Bekhet et al., 2009; Stimson & McCrea,2004).	• Neighborhood integration (Boldy et al., 2010; Clark et al., 2015; Aliakbarzadeh Arani et al., 2021) • good neighbors (Boldy et al., 2010; Clark et al., 2015; Aliakbarzadeh Arani et al., 2021) • social network (Boldy et al., 2010; Clark et al., 2015; Aliakbarzadeh Arani et al., 2021) • Seniors with children (Mutchler & Burr, 2003; Aliakbarzadeh Arani et al., 2021).	• Connectedness to the community (Tyvimaa & Kemp,2011; Groger & kinney, 2006) • Social activities (Tyvimaa & Kemp,2011; Stimson & McCrea, 2004; Baumker et al., 2011; Roy et al., 2018) • Social network(Roy et al, 2018) • Closeness of family (Stimson & McCrea, 2004; Groger & kinney, 2006; Boldy et al.,2010; Bekhet et al., 2009; Baumker et al., 2011).
Physical • The design of the house (Stimson & McCrea, 2004; Tyvimaa & Kemp, 2011)	• Walkability (Buffalo et al., 2010).	• Walkability of the neighbourhood Buffalo et al., 2010). • Appartement (Tyvimaa & Kemp, 2011; Stimson & McCrea, 2004;Tyvimaa & Kemp, 2011) & McCrea, 2004)

Person		
Individual • Education (Wu et al., 2015; Fischer & Malmberg, 2001; Clark & Dieleman, 1996) • Health (De Jong, 2020) • Age (Abramsson & Andersson, 2016)	• Financial status (Week et al., 2012) • Affordability (Stimson & McCrea, 2004)	Marital status (Weeks et al., 2012)
Cultural / group	• Ethnicity (De Groot et al., 2008)	

3. Interviews

This chapter focuses on the interviews that were carried out as part of a study on seniors' place attachment. It begins by outlining the questions that were asked during the interviews and goes on to summarize the key findings. The chapter also discusses the push, barrier, and pull factors that may influence seniors' place attachment. This chapter ends with a long list of factors.

3.1. Interviews

Interviews are one of the best methods for collecting qualitative data and can be used to gather information before designing a survey (Qu & Dumay, 2011). Moreover, useful insights about a person's perspective can be obtained through an interview.

The aim of the interviews in this study is to gain insight into seniors' place attachment at housing associations and whether it corresponds to the push, barrier and pull factors of place attachment found in the literature. The interviewees all work with seniors and the interviewees can provide insight into whether place attachment is also a practical barrier. Moreover, the interviewees can validate which of the push, barrier and pull factors based on place attachment are relevant. The interviewees can also provide insight into whether there are factors that appear in the literature but not in reality. This may provide relevant information for the further course of this study.

The interviews were conducted using a semi-structured interview method. The semi-structured interview method allows for both open and closed questions to be asked, providing a flexible approach to collect data (Qu & Dumay, 2011). This method enables researchers to ask prepared questions to ensure that key topics are covered, while also allowing for unprepared questions to be asked, which can uncover unexpected insights (Qu & Dumay, 2011). Additionally, the semi-structured interview method allows for questions to be extended, providing an opportunity to explore topics in more depth and to gain a better understanding of the participant's perspective (Qu & Dumay, 2011). This approach is particularly useful when seeking to gain insight into complex or nuanced topics, as it allows for a more comprehensive understanding of the subject matter (Kvale and Brinkmann, 2009).

Table 4 provides a summary of the interview questions. The questions are divided into six categories. The first category concerns general questions about the neighborhood and the house. The questions were asked to gather information about how seniors define the neighborhood and whether seniors are willing to relocate within the neighborhood. This information can provide insights into seniors' place attachment and whether seniors would prefer to relocate within a short distance to continue. The second category deals with the policies of housing associations. The third category is about seniors' place attachment and whether interviewees recognize it and take measures to overcome it. Finally, categories four, five, and six deal with the attributes process, place, and person of the conceptual model. The aim is to identify the push, barrier, and pull factors experienced by interviewees during their work. These factors can be analysed to determine whether they align with the literature review and whether there are factors that seniors requested but were not addressed in this study. This can provide important insights into relevant factors.

Table 4: Interview questions

Topic	Question
General	1. How do seniors define their own neighbourhood? 2. To which neighbourhood / house would seniors like to move & how far are seniors willing to move? 3. What is your definition of a neighbourhood / senior friendly neighbourhood?
Policy	4. Is there a policy from housing association x to actively encourage seniors to move, what is this policy and who is involved in this?
Place attachment	5. Do you recognise place attachment as a barrier to moving? 6. How does housing association x try to overcome the obstacle of attachment to the neighbourhood/home?
Process	7. What are the factors of process that make seniors willing to move? 8. What factors of process that attracts seniors to suitable housing?
Place	9. What are the factors of place that make seniors willing to move? 10. What factors of place that attract seniors to suitable housing?
Person	11. What are the factors of person that make seniors willing to move? 12. What factors of person that attract seniors to suitable housing?

Table 5 provides a summary of the interviewees. The table includes relevant information such as the function of the respondent, the name of the organization, the type of organization, and the date of the interview.

Table 5: Respondents interviews

Respondent	Date of interview	Organization	Type of organisation	Job title
Respondent 1	11-05-2022	Woonstad Rotterdam	Housing association	Housing consultant Rotterdam-South
Respondent 2	20-05-2022	Vidomes	Housing association	Senior real estate agent
Respondent 3	23-05-2022	Woonstad Rotterdam	Housing association	Housing consultant Rotterdam-centre
Respondent 4	27-06-2022	Havensteder	Housing association	Housing consultant
Respondent 5	30-06-2022	Acantus	Housing association	Policy advisor Strategy and Communications

3.2. Results interviews

In this section, the results of the interviews are presented, focusing on seniors' place attachment. However, the discussion begins with general information about seniors' relocation approach.

Most of the interviewees had experience with seniors' place attachment in the course of their work, but were not able to make a significant impact in overcoming the attachment to house, neighbourhood of people in the neighbourhood. The interviewees approached seniors who were living in houses with three or more rooms, but only a few seniors were willing to schedule an appointment to discuss the option for relocating. Additionally, interviewees attempted to influence seniors' place attachment by scheduling viewings of homes that were already rented out. During these viewings, seniors could gain insight into a potential new home, with the hope of convincing them to relocate. However, few seniors were willing to schedule viewings. Finally, through the relocation program VGNB, as described in section 2.1, the housing associations aim to maintain the same rent and thereby eliminate a barrier to relocation. Furthermore, the program also allows them to expand the housing supply.

Furthermore, most interviews showed that seniors tend to relocate within the same neighbourhood due to their attachment to both the neighbourhood and people in the neighbourhood. They are familiar with the area, having lived there for an extended period of time, and have established connections in the neighbourhood. Additionally, they are familiar with the amenities in their current neighbourhood and do not want to move to another neighbourhood.

The definition of "neighbourhood" for seniors depends on their physical condition and social contacts. Seniors with a limited ability to walk or move have a smaller neighbourhood compared to those who are physically more able. Moreover, seniors with more social contacts have a larger neighbourhood as they visit these contacts. On the other hand, the neighbourhood for a lonely senior is smaller.

Place attachment is recognised by the vast majority of interviewees However, the exact percentage of seniors who experience place attachment remains unclear. This perception is challenged by the experience of one interviewee, who receives weekly requests from seniors seeking suitable housing. Nonetheless, this interviewee also acknowledges that there could be a group of seniors who are not visible and may be experiencing place attachment as a barrier to relocation.

Concerning the three aspects of place attachment as proposed by Scannel and Gifford (2010), the interviews revealed the following insights:

Process: the interviewees identified daily routines, public transport, relocation service, relocation subsidy, and identity as push/pull factors that may play a role. The majority of interviewees emphasized the importance of easily accessible daily routines and public transport, including supermarkets and family doctors. These aspects were considered crucial to maintain seniors' independence. Additionally, a relocation service and subsidy were mentioned as pull factors that could reduce barriers to relocation. Seniors with few contacts and limited savings may find it difficult to relocate without assistance, and could reduce barriers for moving. Finally, several interviewees mentioned identity as both a pull factor and a barrier. Seniors prefer to live in places where they can identify themselves, but this may also create an attachment to their current location.

Place: the interviewees identified being closer to family (children) or friends, social contacts, a green environment and a turnkey house as push/pull factors that may play a role. According to the interviewees, place was the most significant aspect of Scannell and Gifford's model. The interviewees revealed that seniors have a common desire to live near their family or friends, as this enables their loved ones to take care of them. Social contacts were also considered essential as they prevent seniors from feeling isolated. However, it is important to note that not all seniors seek frequent social interactions with other seniors. In some cases, living in buildings with many seniors can lead to social problems, including gossip and bullying. Recreation rooms are sometimes provided, but seniors do not always use them. However, not all interviewees recognized the importance of green space. The interviewees who recognize the importance of green space are those where seniors already live in a green environment. Another pull factor identified by the interviewees is a turnkey house, which refers to a ready-to-move-in home. Many seniors may face difficulties in moving or renovating a house, especially if seniors lack assistance. Therefore, living in a turnkey house can be a significant advantage, as it eliminates the barrier of moving or renovating.

Person: the interviewees identified ethnicity, health, education level and rent remains the same as push/pull factors that may play a role. One important finding is that seniors living in a neighbourhood with people of the same ethnicity may consider it a barrier to relocation and therefore be more place attached. Further that higher housing costs could lead to a barrier. Additionally, all interviewees agree that seniors in poor health are more likely to be willing to relocate and thus less attached to their current home. Education level was identified as a pull factor, as the seniors who tend to seek out the interviewees' services are generally more educated and forward-thinking about their future.

Table 6 provides a comprehensive list of all the factors that emerged from both the literature review and the interviews, with the characteristics identified in the interviews highlighted in bold.

Table 6: Overview factors based on literature study and interviews

Push	Barriers	Pull
Process		
Affect	• Safe feeling / environment (Boldy et al., 2010; Aliakbarzadeh Arani et al., 2021).	• **Relocation assistance (interviews)** • **Relocation subsidy (interviews)**
Cognition	• Public transport (Turcotte & Schellenberg, 2006)	• Public transport (Stimson & McCrea, 2004; Tyvimaa & Kemp, 2011)
Behaviour • Instrumental Activities of Daily Living (IADLs) (Edemekong,2022) • Maintaining the house and garden (Boldy et al.,2010; Groger & kinney, 2006; Stimson & McCrea, 2004; Bekhet et al.,2009; Tyvimaa & Kemp, 2011)	• Accessibility of facilities (Boldy et al., 2010; Aliakbarzadeh Arani et al., 2021). • Length of residence (Roy et al., 2018). • Daily routines (Roy et al., 2018)	• Closer to amenities such as grocery stores, public transport and family doctor (Boldy et al.,2010; Stimson & McCrea; Tyvimaa & Kemp, 2011; Costlow et al., 2020) and health centers (Turcotte and Schellenberg, 2006) •
Place		
Social • Social isolement and loneliness (Tyvimaa & Kemp, 2011; Bekhet et al., 2009; Stimson & McCrea,2004).	• Neighborhood integration (Boldy et al., 2010; Clark et al., 2015; Aliakbarzadeh Arani et al., 2021) • good neighbors (Boldy et al., 2010; Clark et al., 2015; Aliakbarzadeh Arani et al., 2021) • social network (Boldy et al., 2010; Clark et al., 2015; Aliakbarzadeh Arani et al., 2021) • Seniors with children (Mutchler & Burr, 2003; Aliakbarzadeh Arani et al., 2021). • **Identity (interviews)**	• Connectedness to the community (Tyvimaa & Kemp,2011; Groger & kinney, 2006) • Social activities (Tyvimaa & Kemp,2011; Stimson & McCrea, 2004; Baumker et al., 2011; Roy et al., 2018) • Social network(Roy et al, 2018) • Closeness of family (Stimson & McCrea, 2004; Groger & kinney, 2006; Boldy et al.,2010; Bekhet et al., 2009; Baumker et al., 2011). • **Identity (interviews)** • **Living closer to family (Interview)**
Physical • The design of the house (Stimson & McCrea, 2004; Tyvimaa & Kemp, 2011)	• Walkability (Buffalo et al., 2010).	• Walkability of the neighbourhood Buffalo et al., 2010).

		• Appartement (Tyvimaa & Kemp, 2011; Stimson & McCrea, 2004;Tyvimaa & Kemp, 2011) & McCrea, 2004) • **Green environment (Interviews** • **Turnkey home (Interview)**
Person		
Individual • Education (Wu et al., 2015; Fischer & Malmberg, 2001; Clark & Dieleman, 1996) • Health (De Jong, 2020) • Age (Abramsson & Andersson, 2016)	• Financial status (Week et al., 2012) • Affordability (Stimson & McCrea, 2004)	• Marital status (Weeks et al., 2012)
Cultural / group	• Ethnicity (De Groot et al., 2008)	

3.3. Long list with factors and levels

The literature study started with the conceptual framework and investigating the push, barrier and pull factors of place attachment. The aim of this chapter was to gain insight into seniors' place attachment at housing associations and to determine whether it corresponds to the push, barrier, and pull factors of place attachment found in the literature. Through the literature review and interviews, the relevant factors were identified, and two levels were established based on the interviews (See table 7).

Table 7: Longlist with factors

Aspect	Factors	Factor Level 0	Factors Level 1	Reasoning
		Place attachment: Process		
Affect	Relocation assistance	Yes	No	According to interviews, seniors are attached to their homes because it can be difficult to move and bring everything back in old state. Therefore, relocation assistance can attract seniors to new locations.
Affect	Relocation subsidy	Yes	No	According to the interviews not all seniors have enough money. Therefore, relocation subsidy can attract seniors to new locations.
Affect	Safety neighbourhood	Safe neighbourhood	Unsafe neighbourhood	A safe environment strengthens the attachment of the place. Therefore moving into a safe environment can attract seniors to new locations.
Cognition	Public transport	Public transport is closer than current situation	Public transport is further away than current situation	Seniors are dependent from public transport if they want to move around.
Behaviour	Grocery stores	Grocery stores are closer than current situation	Grocery stores are further away than current situation	Grocery shopping ensure that's seniors stay independent.
Behaviour	Facilities	Facilities are concentrated in one place within walking distance from current situation	Facilities are spread in the neighbourhood on biking distance from current situation	Carrying out daily activities ensure that seniors stay independent.
		Place attachment: Place		
Social	community connectedness	Stronger than current situation	Weaker than current situation	A stronger connectedness of the community could seniors stimulate to move.
Social	Social activities	More activities are possible than current situation	Less activities are possible than current situation	Social activities could seniors stimulate to move to new locations

Social	Social network	My network / social contacts are larger in this environment than in my current situation	My network / social contacts in this environment are smaller than in my current situation	A social network could seniors stimulate to move to new locations
Social	Neighbours	Contact with the neighbours is better than current situation	Contact with the neighbours is weaker than current situation	Seniors are most of the day at home, therefore good contact with neighbours could stimulate seniors to move
Social	Families (Children)	Family lives closer than current situation	Family lives further away than current situation	Seniors want to live closer to their children, so that if they need help, they are close to the children.
Social	Loneliness	Less loneliness than current situation	More loneliness than current situation	Loneliness could stimulate seniors to move.
Social	Identity	I can identify more with these people in this environment than my current environment	I can identify less with these people in the area than my current environment	Identity was a factor that could stimulate seniors to move according to the interviews with the experts
Physical	Turnkey home	Yes	No	A turnkey home could seniors to stimulate to move to a new home
Physical	Walkability	The walkability of this area is more elderly-friendly than my current situation	The walkability of this area is less elderly friendly than my current situation	If the environment is not senior friendly this could stimulate elderly to stay into their current homes
Physical	Green environment	Yes	No	A green environment could stimulate elderly to move to new homes.
Physical	Park	Yes, at walking distance	No	A park at walking distance could seniors stimulate to move to new homes

3.4. Conclusion

The aim of this chapter was to gain insight into seniors' place attachment at housing associations and to determine whether it corresponds to the push, barrier, and pull factors of place attachment found in the literature. Semi-structured interviews were conducted with individuals who work with seniors, and the results were analysed. The interviews revealed that seniors tend to relocate within the same neighbourhood due to their attachment to both the neighbourhood and the people in the neighbourhood. Moreover, the perception of a neighbourhood for seniors is dependent on their physical condition and social connections. The interviews showed that seniors with limited physical ability have a smaller neighbourhood, while seniors with more social contacts have a larger neighbourhood.

The majority of the interviewees recognize the concept of place attachment, but the exact percentage of seniors who experience place attachment remains unclear. Additionally, the interviews revealed several push, barrier, and pull factors that may play a role in seniors' place attachment. These include daily routines, transportation, green environment, relocation service, relocation subsidy, and identity. On the other hand, factors such as being closer to family (children) or friends, social contacts, and a turnkey home were found to be important in the aspect place of place attachment. In terms of the aspect person of place attachment ethnicity, health, and education level were identified as significant factors. Table 6 provides a comprehensive list of all the factors that emerged from both the literature review and the interviews, with the characteristics identified in the interviews highlighted in bold.

4. Merging of two studies[1]

This chapter brings together two studies that both focus on the relocation of seniors data. First, it is important to note that both studies focus on addressing the housing needs of seniors, particularly in the context of relocating to a more suitable home that meets their third-age needs. While one study focuses mainly on improving existing best practices with an emphasis on financial considerations, the other study examines the role of place attachment in the relocation process. By integrating these two studies, the researchers aim to expand their data collection efforts by working with different housing providers, with the goal of obtaining more comprehensive and representative results. To begin with, a list of relocation factors was compiled based on the findings from both studies. Although each study put forward its own set of relocation factors, arising from literature review and interviews, they complement each other, as shown in Figure 7.

Section 4.1. describes the relocation factors that are relevant when moving and also presents the personal characteristics (socio-demographic, physical condition and satisfaction with home and living environment) that are included.

4.1. Operationalization of relocation and personal factors in the utility

Figure 7 shows a selection of the relocation- and personal factors affecting the utility of relocation. The selection of these factors is described in section 4.1.1. and 4.1.2. The right part of the figure gives an overview of relocation-related characteristics, aggregated into three groups. The left part of the figure shows person-related characteristics. We aim to test empirically how important are the relocation factors and whether this importance differs by type of seniors.

It can be concluded that factors (location, daily facilities, rent and relocation subsidy) emerge from both studies. Factor 3 (walking paths) comes from the study on “Place-attachment” and factor 4 (Indoor climate & energy bill) comes from the study on “best practices”.

To ensure practical feasibility and reduce possible cognitive burden among participants, we will restrict the number of possible factors, as compared to the long lists that came out of the literature and interviews.

The relocation factor “personal guidance” was omitted. Literature study and interviews revealed that personal guidance throughout the customer journey can be very helpful for seniors, as it is sometimes difficult to carry out a relocation on their own. Since this factor was mostly observed during interviews and not from interviews, it was decided to omit this factor. In addition, the factor) “social activities” was also omitted. It appeared that social activities can prevent loneliness among people. Furthermore, the factors “opportunity to live closer to children / close relatives”, coming from both studies, was omitted as well. Interviews revealed that seniors sometimes like it when support can be provided by people in their own circle. Furthermore, relocating to a dwelling with “at least 2 bedrooms”, coming from the study on best practices was omitted. Finally, the factor “living with like-minded people in a community” was omitted as

[1] Jointly written

well. From interviews, some tenants prefer innovative living environments where they can undertake activities together and provide support to each other if needed.

4.1.1. Explanation of relocation characteristics

The first factor is location. According to several studies, people are attached to the home, the neighbourhood and the people in the neighbourhood (Cheshire & Forrest, 2021; Gibler & Tyvimaa, 2015; Judd, et al. 2014). Furthermore, neighbourhood integration and the presence of a social network are also important for seniors (Boldy et al, 2010; Clark et al, 2015; Aliakbarzadeh Arani et al, 2021). In addition, some studies such as Tyvimaa & Kemp, 2011; Boldy et al.,2010; Bekhet et al., 2009 indicated that having a community nearby or being near family may also influence the consideration of relocation. Moreover, most expert interviews revealed that seniors often want to live as close to their current home as possible. Therefore, the location of the home is identified as a relevant factor.

The second factor is proximity to daily amenities. It appears that daily routines are a factor influencing place attachment (Roy et al., 2018). Daily routines may include shopping or going to the doctor. These aspects were mentioned in the literature review (Boldy et al.,2010; Stimson & McCrea, 2004; Tyvimaa & Kemp, 2011; Costlow et al., 2020) and were confirmed during interviews with experts

The third factor is the presence of accessible green walking paths near the dwelling. The literature review showed that walkability is important (Stimson & McCrea, 2004). Van Wijk (2022) and Ossokina et al. (2022) also specifically stated that walkways should be accessible. Moreover, interviews revealed that seniors who live close to greenery are less willing to move to a place without greenery or walking areas. Since this emerged from the literature and interviews, it was decided to include this aspect in figure 7.

The fourth factor is based on living comfort (indoor climate & reduction of energy bills). Literature review and interviews with experts show that living comfort, accessibility and shared facilities become increasingly important as people reach the third age (Ossokina & Arentze, 2020). This factor is therefore also included in Figure 7.

The fifth factor is rent level. The financial status was found to be able to influence place attachment (Weeks et al., 2012) which was also supported during the interviews. In addition, people are reluctant to relocate if they suffer financial deterioration or have to pay more rent per month (Cheshire & Forrest, 2021; Judd., Liu., Easthope & Bridge, 2014; Adair & Menyen, 2014). Therefore, rent level is included in the stated choice experiment.

The final and sixth factor is relocation subsidy. Several interviews revealed that a relocation subsidy can encourage seniors to relocate. One of the reasons why a relocation subsidy can compensate for location considerations with regard to relocation is that seniors have to deliver the house upon completion in the condition it was in at the start, and this often involves additional costs. Therefore, a relocation subsidy can help overcome this obstacle and therefore is included in figure 7.

4.1.2. Explanation of personal characteristics

The personal characteristics are included because it is known that different groups of seniors differ in their preferences (e.g., study by de Jong et al. (2021) that there is not a single type of senior). The personal characteristics are divided into three categories: 1) socio-demographic, 2) physical condition and 3) current housing characteristics. The categories emerge from various studies into preferences of seniors such as the residential survey of CBS (2017).

Social demographics consist of age, gender, education level, ethnicity and household composition. Socio-demographic characteristics of participants are useful for housing associations to understand the needs of tenants from different backgrounds. Housing characteristics are divided into current living comfort and rental level and satisfaction with current home and living environment. Finally, the physical condition (e.g., how easily a person can climb stairs) of seniors forms a separate block.

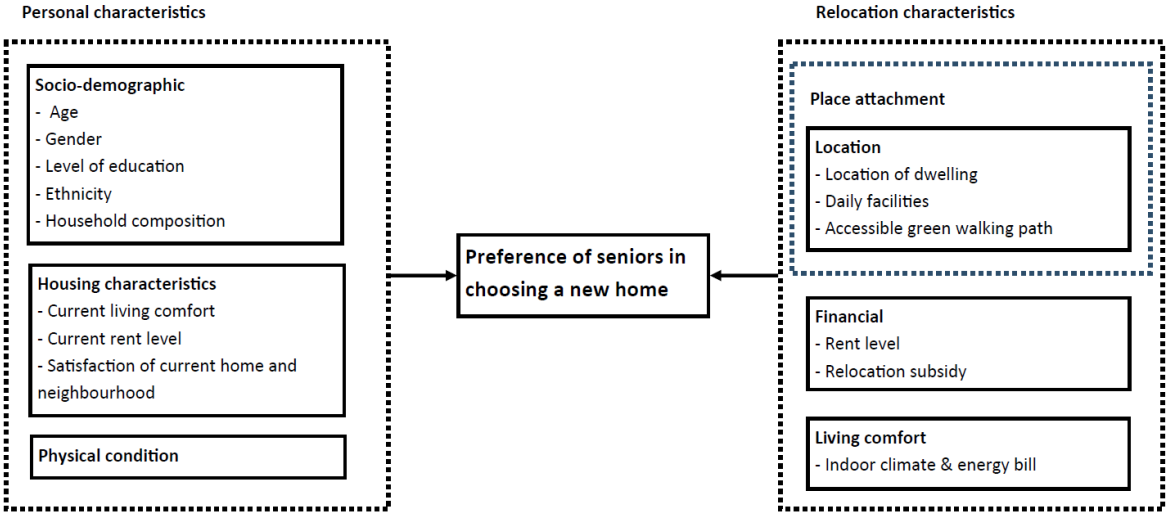


Figure 7:Overview of factors potentially influencing seniors' preferences in a move

4.2. Hypotheses[2]

Hypotheses can be tested for various reasons. For example, (poor) physical conditions could have positive effect on the willingness to relocate. In addition, satisfaction of tenants about their current home and living environment (e.g., neighbourhood or travel time to daily facilities) can determine whether these factors influence the willingness to relocate. For example, poor current living comfort may persuade seniors to choose a home with improved comfort and a more efficient indoor climate. In addition, low current rent could influence seniors in the decision to not relocate since it would be likely that rent increases. Based on the conceptual model, hypotheses are formulated.

H1 = Seniors find attachment to neighbourhood the most important relocation characteristic.

As previously mentioned, seniors tend to form attachments with their home, neighborhood, and the people in the neighborhood. According to the interviews conducted, it was found that seniors place a high value on their neighborhood. Seniors are expected to prioritise their attachment to the neighbourhood over their attachment to the house. Therefore, this factor is expected to be preferred over other relocation characteristics in the experiment.

[2] Hypotheses are individually formulated

H2: Seniors' preference for location factors (including dwelling location, daily facilities accessibility, and accessible green walking route) will have a stronger impact on their decision to relocate than financial incentives (rent and relocation subsidies, based on the VGNB program).

According to the findings from the interviews, seniors are strongly attached to their homes, neighbourhood and people in the neighbourhood. Moreover, the relocation programmes of housing associations, such as VGNB, which were designed to convince seniors to move, did not appear to make a significant impact, as discussed in section 2.2. Therefore, the hypothesis is that seniors in the experiment consider the location more important than financial incentives.

H3 = Seniors who live currently near a green accessible walkable route find a green walking route more important than for those not living near a green walkable route.

Based on the literature review, it was found that walkability creates attachment to the neighbourhood. Furthermore, interviews revealed that seniors are attached to greenery in the neighbourhood. It is further expected that seniors living in a place with a lot of greenery are less willing to move to an environment with less greenery. Therefore, seniors who live near a green walkable path are expected to value it more than seniors who have none.

4.3. Conclusion

Chapter 4 presents the merging of two studies focusing on the housing needs of seniors and their relocation to more suitable dwellings. The establishment of relocation factors emerged from both studies, with a focus on best practices with an emphasis on financial aspects and the role of place attachment in the relocation process. By integrating the findings of both studies, the researchers were able to establish a comprehensive framework that includes six relocation factors: location, daily facilities, energy efficiency, rent, relocation subsidy, and walking paths. In addition, personal characteristics of seniors were included in the analysis, as understanding heterogeneity among different subsamples of seniors is important for tailoring relocation programs to their needs. The hypotheses formulated based on personal and relocation characteristics can be useful in testing for heterogeneity.

5. Methodology[3]

This chapter describes the methodology to achieve the objective of this research. This research focuses on the preferences of seniors with respect to the features of place attachment and best practices that may influence the willingness-to-relocate and overcome the barrier of place attachment. Apart from literature study and interviews a stated choice experiment (SCE) is developed and carried out that will indicate which factors are perceived as important to seniors in relocating to an alternative home. The experiment is introduced in this chapter and designed in chapter 6.

5.1. Introduction to a stated-choice experiment (SCE)

In order to stimulate the residential mobility of seniors and to make relocation programs more successful, it is important to understand their preferences when relocating to smaller, more suitable dwelling. Insights from interviews showed several factors (obstacles & incentives) which might influence the willingness to relocate of seniors; however, these insights are still from the perspective of the housing association. In addition, although qualitative data has emerged from interviews with various seniors in relation to the experience of using a relocation program, this data is still limited.

To be able to test various hypotheses related to the preferences and characteristics of tenants when relocating to a smaller, more suitable dwelling, it is important to obtain quantitative insights on individual level. As an example, it could be that the age of seniors plays a role in a relocation. Older seniors (75+) may have other wishes than seniors between the age category of 55-75. Also, the current amount of rent that tenants have to pay each month could influence their willingness to relocate. Therefore, the aim of this experiment is to test several hypotheses where tenants can indicate their preferences and make a decision between two relocation programs or choose for ''none of these '' option. Ultimately, this will allow housing associations to improve their existing best practices. In essence, there are two different data collection approaches which are often used for testing preferences and decisions: revealed- and stated modelling approaches. The main difference here is the type of data used. In a revealed approach, data is collected from real observations made in practice, whereas in stated approaches the researcher observes in controlled hypothetical situations (Kemperman, 2000).

The revealed- and stated modelling approaches have different advantages and disadvantages. A disadvantage of a revealed modelling approach is the fact that only one observation can be made per respondent and that many respondents are needed which results in higher data collection costs. Another disadvantage of this approach is that the actual specification of the “choice set” is not always clear for the researcher. For example, not all alternatives may be observed by the researcher and therefore outcomes of “unknown” alternatives could lead to biased parameters estimates (Kemperman, 2000). Stated approaches can potentially deal with these disadvantages. Firstly, it is possible to have control over hypothetical alternatives and attribute levels presented to the respondents. In addition, more observations can be made among respondents; several alternatives with different attributes can be presented. This increases the practical feasibility of the data collection. A potential disadvantage of stated

[3] Jointly written

experiments is the possibility of having low external validity since hypothetical choices may differ from their actual choices (Kemperman, 2000). As current relocation programs in practice are limited in their variation as well as the unfeasibility of developing relocation programs with extensive differences, a "stated" approach is used. In addition, it would be very time consuming and expensive for housing associations to develop new choice alternatives in a real situation. In addition, discussions with experts show that relocation among seniors often takes a long time, so it would be difficult to implement new relocation programs which are carried out in the time-span of this research.

Figure 8 presents, a "stated" approach consists of two possibilities: stated preference (SP) and stated choice (SC) (Kemperman, 2000). Generally, a SP (compositional and de-compositional) is about *ranking* attributes (e.g., which attributes are preferred and which are least preferred) or *rating* attributes (which attributes are rated higher on a scale?) (Louviere, Hensher & Swait, 2000). For example, a preference *ranking* related to this research could be seniors choosing their preference order in terms of outdoor space; e.g., garden more preferred than balcony and communal inner garden, balcony preferred above communal inner garden. However, this says nothing about the degree of preference (Louviere et al. 2000). In addition, in terms of *rating* individuals can assess their preference on a category rating scale. For example, seniors can assess possible outdoor areas in terms of ratings (e.g., own garden = 8, balcony = 7, communal inner garden =5). However, differences between numbers (e.g., '3' and '5') are difficult to interpret (Louviere et al. 2000). In contrary to SP, SC (stated choice) present alternatives (choice sets) where someone can choose from. Here, several alternatives are presented as well as the "no alternative" option (Louviere et al. 2000; Kemperman, 2000). Ultimately, this means that three different methods can be used within this study: *ranking* (de-compositional, conjoint), *rating* (compositional, no conjoint) and *choice* (de-compositional, conjoint).

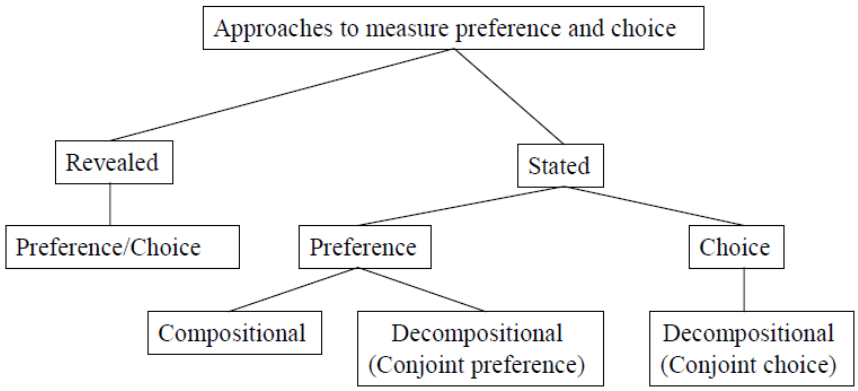


Figure 8:Overview of preference and choice measurement approaches (Kemperman, 2000)

Although a compositional approach holds some advantages, Green and Srinivasan (1990) listed various problems (e.g., respondents may not hold all else equal when they provide ratings for the levels of an attribute) with using a compositional approach and therefore this study chooses between de-compositional approaches. The difference between both methods is that in a *ranking* task, respondents have to rank the profiles in order of preference (most to least preferred). A disadvantage here is that no insights are obtained related to the degree of preference respondents have for profiles (Ben-Akiva, et al., 1997). Secondly, ranking several relocation programs would be difficult since respondents can only handle a limit number of profiles (Kemperman, 2000).

For this research a *stated choice experiment* is carried out since respondents (seniors) are forced to actually make a choice between two or more hypothetical alternatives (relocation programs). Secondly, according to previous research *stated choice* tasks also have some benefits in comparison to *stated preference* tasks. Choice tasks give a more realistic view of a current (real world) situation compared to rating or ranking tasks. In a real-world situation, seniors also have to make decisions in terms of choosing the right housing alternative for their needs. Secondly, choice tasks also give the opportunity to include a "none of these" option (Kemperman, 2000). A drawback of using a *stated choice experiment* is the difficulty of developing models on individual level since nothing is known about the no-alternative option. Therefore, more observations are needed to develop individual models (Kemperman, 2000).

5.2. Stated choice experiment

According to Hensher et al. (2015), the origin of a stated choice experiment lies in its experimental design. This experimental design observes effects of variables where levels of an attribute or multiple attributes can be manipulated. The manipulation takes place in the "design phase" of the experiment. Furthermore, each attribute is called a "treatment". A combination with multiple attributes and different levels is then called a "treatment combination" or a profile (Hensher et al., 2015). Within this research attributes and profiles are used as terminology instead of treatment and treatment combination. Figure 9 presents the steps in developing a stated choice experiment.

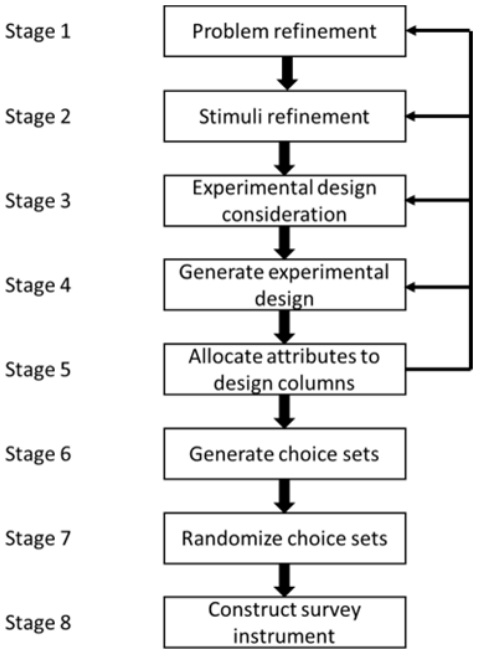


Figure 9:Experimental design process (adapted from Hensher et al., 2015)

5.3. Utility of the alternative

Utility of alternatives where seniors can you from is determined by formula (1. Here, the alternative with the highest utility U_{iq} is assumed to be chosen as an alternative by individual *q*.

$$\textbf{(1)}\ \boldsymbol{U_{iq}} = \boldsymbol{V_{iq}} + \boldsymbol{\varepsilon_{iq}}$$

Where V_{iq} is a structural component and ε_{iq} is a random utility component. Subscript *i* is determined by the alternative. Since every senior is different in choosing their preferred relocation program, structural utility component is included with *q (*individual*)*. By summing V_{iq} and ε_{iq} the utility is determined. The structural utility *V* is determined by the sum of each attribute X_n multiplied by its relative weight β_n of all attributes defining a relocation program. To include utility for seniors that are not willing to choose one of the packages, the "none of these" option is incorporated as a constant *α.* This is shown in formula 2.

$$\textbf{(2)}\ \boldsymbol{V_{iq}} = \boldsymbol{\alpha} + \sum_n \boldsymbol{\beta_n}\, \boldsymbol{X_{inq}}$$

The probability *P* that senior *q* chooses alternative *i* over the other alternatives in the choice set can be determined, shown in formula 3. Here, the exponent of the structural utility of alternative *i* is divided by the sum of the exponent of each alternative. When calculating the probability that someone chooses an alternative compared to other alternatives, the probability is always summed up to 1. In this way, it can be determined what the probability is that someone chooses a specific relocation program.

$$\textbf{(3)}\ \boldsymbol{P_{iq}} = \frac{\boldsymbol{EXP}\,(\boldsymbol{V_{iq}})}{\sum \boldsymbol{EXP}\,(\boldsymbol{V_{iq}})}$$

5.4. Conclusion

In conclusion, understanding the preferences and characteristics of seniors when relocating to smaller, more suitable dwellings is crucial for the success of relocation programs. While qualitative data from interviews provides valuable insights, quantitative data is needed to test various hypotheses related to individual preferences. For this study, a stated choice experiment is carried out. Carrying out a stated choice experiment has some advantages compared to other methods. First of all, the attributes themselves can be chosen that are relevant for seniors when relocating to an alternative home. Secondly, "Trade-offs" can be determined. This provides information on the extent to which certain attributes are considered valuable by respondents. Furthermore, a SCE does not have to include existing alternatives. This means that attributes can be chosen which consists of self-defined levels. Based on these observations, it was decided to use an SCE within this study. Ultimately, the results of this experiment will provide valuable information for housing associations to improve their existing best practices in the context of senior relocation.

6. Experimental setup[4]

This chapter presents the experimental setup of the stated choice experiment, based on figure 9. The second stage of the experiment involves refining the list of alternatives, attributes, and attribute levels. The third, fourth, and fifth stages of conducting an experiment involves creating profiles, generating experimental designs, and allocating attributes. Here, the decision is also made to choose a full factorial design or a fractional factorial design. In the sixth and seventh stage in an experiment the choice sets are generated and 40 question groups are randomly assigned to the respondents. The eighth- and final stage within a SCE is constructing the survey instrument. Here, general questions such as social- demographic characteristics are asked and choice sets combinations are inserted into software (e.g., Lime survey).

6.1. Stimuli refinement

In the second stage, as shown in figure 9 (stimuli refinement), the researcher considers refining the list of *alternatives*, *attributes* and *attributes levels*. In creating the list of alternatives, literature study and interviews may aid in alternative identification (Hensher et al., 2015). When having sufficient identified alternatives, the list should be culled to create a manageable list for the execution of the experiment. Here, the researcher can exclude insignificant alternatives. However, these decisions can be somewhat subjective and have more to do with practical than theoretical considerations. In the choice experiment conducted for this study, two alternatives were used along with a "none of these" option. This decision was made with the target group in mind - seniors. It is important to consider that seniors may find it difficult to process and choose from a large number of options. Providing too many alternatives could lead to cognitive burden, potentially resulting in the seniors quitting the experiment. By limiting the number of alternatives to two and providing a "none of these" option, the seniors are presented with a manageable set of options that are easy to understand. The next step was to determine the attributes and attribute levels. This can be a difficult task since each alternative can include different attributes and different levels. When having identified the attributes, the levels can be determined. The levels can be quantitative (e.g., numbers such as travel time) or qualitative (e.g., colour) (Hensher et al., 2015).

Table 8 reports the operationalization of the relocation attributes into levels. See 4.1 for an description of the chosen attributes.

[4] Jointly written

Table 8: Relocation attributes and their levels

Attribute	Levels
Where is the new home located	0. Outside own neighbourhood 1. In own neighbourhood (max. 15 min walking)
Where are the facilities (e.g., Supermarket/ doctor/ -community house)	0. Distributed in the neighbourhood; everything within 15 minutes' walk 1. All together; a 5-minute walk from the dwelling
Well-accessible green walking route nearby	0. No 1. Yes
Indoor climate & energy usage	0. The same as current dwelling 1. the house is energy efficient (cooler in summer & warmer in winter, fewer draughts and lower energy bills
New rent / mortgage costs?	0. Rent /mortgage costs goes up 100 euros a month 1. Remains the same
Relocation subsidy	0. No 1. Yes, a one-off 4,000-euro subsidy

6.2. Experimental design

The third stage (experimental design consideration) is about creating *profiles, the fourth step is about generating the experimental design and the fifth step is allocating the attributes to the designed columns.* Profiles can be determined based on a *full factorial design* and a *fractional factorial design*. A full factorial design includes all possible combinations of attributes and levels. In this study, a full factorial design consisting of two levels per attribute would create 64 possible combinations (profiles) (2^6=64). With a large number of possible profiles cognitive burden may arise among respondents when carrying out a lot of choice sets (Hensher et al., 2015). An alternative for this is (1) reducing the number of levels, (2) fractional factorial design and (3) blocking the design. For the purpose of this research, a fractional factorial design is described. For this study, 16 different profiles were used. This choice was made because a larger number of profiles leads to a larger number of unique combinations. This allows the results to be estimated more accurately. The design with 16 profiles, using dummy coding is shown Appendix III.

6.3. Generate choice sets & Randomize choice sets

In the sixth and seventh step, a total of 40 question groups were developed, with each group having 4 choice sets. Every participant was assigned with a randomly chosen question group. In addition, the choice sets (where each choice set consists of 2 profiles) were also randomly constructed. The randomization eliminates potential biases that may have resulted from a fixed order of set. It is important to note that the randomization was not based on any theoretical considerations or predetermined criteria. Instead, it was done purely to ensure that each respondent was presented with a different set of alternatives, thereby increasing the diversity of the data collected.

6.4. Construct survey instrument

The eighth step within a SCE is constructing the survey instrument. Here, general questions such as social-demographic characteristics are asked and (unique) choice sets combinations are inserted into software (e.g., Lime survey)

In the development of the experiment, the focus was on ensuring that the survey questions were easy to understand for respondents. This includes looking at the number of questions and the description of the questions. Lime survey was used for the digital design of the experiment to collect the data. The stated choice experiment conducted in this study includes personally identifiable data of the participants. Since privacy is an important factor, it was important to describe how to deal with this. In addition, it is important that data management goes in accordance with the rules set by the Eindhoven University of Technology. Before the data was collected, the survey had an ethical review, taking into account the privacy regulations for data collection and storage. Hereby, the survey was reviewed by the supervisors of the study as well as by the Ethical Review Board (ERB) of TU/e (TU/e, n.d.), as shown in appendix I. In addition, the FAIR principle was taken into account when collecting data. By implementing a set of guiding principles, it makes it possible to make the data findable, accessible, interoperable and reusable (TU/e, n.d.).

In the actual experiment, participants were firstly informed about the ethical review and their privacy regarding the survey. An agreement was then signed by the respondents. Secondly, participants were asked some general questions about 1) socio-demographic, 2) physical condition and 3) current housing characteristic. Thirdly, a hypothetical situation was presented where the respondent's housing association explains a possible relocation to an alternative dwelling, using a relocation program. Here, the benefits associated with relocating to an alternative home were revealed (e.g., less incidents at home, living longer independent etc.). The complete survey is shown in Appendix II.

6.5. Number of respondents

According to Rose & Bliemer (2013), several studies have come out with rules of thumb to determine the minimum sample size for a stated-choice experiment. A commonly applied rule of thumb to examine main effects and not interaction effects between samples is presented by Orme's (1998) research is shown in formula 4:

$$\frac{NTA}{C} > 500 \qquad (4)$$

N = Number of respondents
T = Number of choice tasks
A = number of alternatives in each task
C = maximum levels per attribute

Because of the choice to estimate main effects, this formula can be applied. By presenting 4 choice tasks (T), 2 alternatives for each task (A) and 2 levels for each attribute (C), a total of at least 125 respondents are needed. However, Orme (2019) suggests that statistical analysis requires at least 200 or 300 respondents for quantitative research. The differences between these numbers are based on whether the authors analyse differences between group of respondents (300 respondents), or 200 if no comparisons between subgroups are performed. Interestingly, Rose & Bliemer (2013) indicate that these assumptions are based on experience from a limited number of studies rather than statistical theory. In addition, Orme (2019) indicates that the suggestions, from at least 300 respondents, are also based on the cost of the study and own experience, application of statistical principles and sound judgement. In this study, the experience of the research group indicates that 125 would be sufficient and practically feasible.

6.6. Conclusion

This chapter describes the steps in creating a stated-choice experiment. In the second phase, a list of alternatives is established, consisting of six attributes and with each two attribute levels. In the third stage, 16 profiles are established and in the fourth stage, the experimental design is made (shown in Appendix iii). The fifth stage involves assigning attributes to the designed columns using a fractional factorial design to avoid cognitive burden. In the sixth and seventh phases, four choice sets are generated and randomised for presentation to each respondent. Here, 40 unique questions groups consisting of 4 choice sets were created. In the eighth stage, the survey instrument is constructed to ensure that respondents can easily understand it. Chapter 6.5 also addresses the minimum sample size required for a stated-choice experiment. It is indicated that at least 125 respondents are needed.

7. Data analysis[5]

Before the actual data collection started, it was important to determine the target group. Initially, the intention was to ask only respondents to participate who currently live in a social rented house, but as it was not practically feasible to cooperate with several housing corporations, it was also decided to extend the experiment wider to the owner-occupied sector. For the rental variant, housing corporation Vidomes sent the experiment to around 500 respondents on their behalf. In addition, several platforms such as Facebook and LinkedIn were used to send the experiment to social-rental tenants. This was also done for the owner-occupied sector. A total of 135 people fully completed the survey (88 owner-occupied and 47 rental). The target group consisted of people above the age of 55.

Because of the distinction between owner-occupied and rental sector, the number of respondents coming from a rented or owner-occupied house has been indicated separately. In the descriptions of socio-economic, physical condition and satisfaction with home and environment, the outcomes are described for the owner-occupied sector and the rental sector separately.

7.1. Descriptive statistics

This section describes subsequently: socio-economic, physical condition and satisfaction with home and living environment. Figure 10 shows that most participants in owner occupied are between 55-65 years of age (74%). In rent, most people are as well between age category 55-65 (51%), however the population 75+ is 17% in rent compared to 2% in owner-occupied. Therefore, the age categories in rent are more even distributed than in owner-occupied.

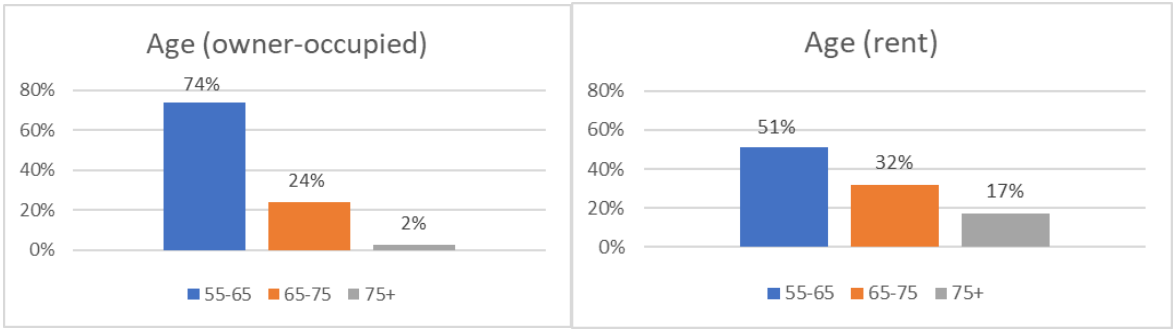


Figure 10:Socio-economic data from sample (age)

In terms of household composition, figure 11 shows that most participants within the owner-occupied sample are a couple (58%). The rental sample shows that there are as many singles as couples in percentage terms (43%). In contrast, 10% of the owner-occupied sector consists only of single households. This large difference is remarkable. Furthermore, 32% of the owner-occupied sample still lives with their children, compared to 15% in rental sample. This is not remarkable, since the age of people in rental sample is generally higher.

[5] Jointly written

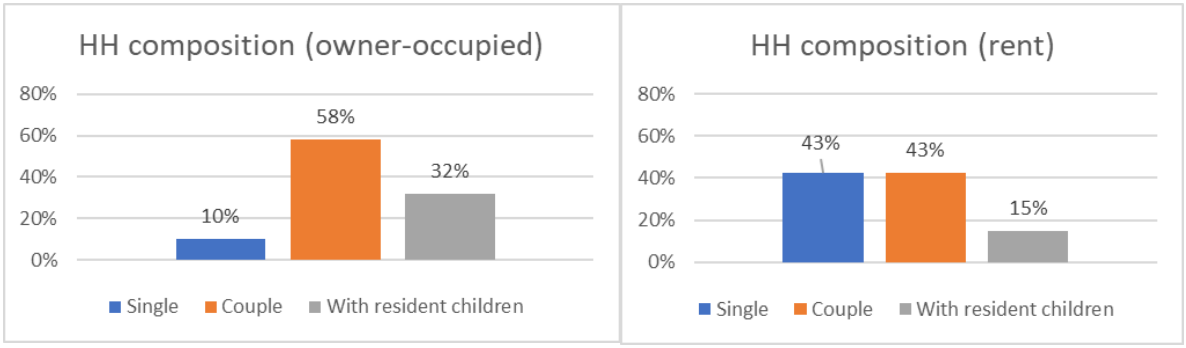


Figure 11:Socio-economic data from sample (household composition)

In terms of educational level, figure 12 shows that only 39% of the owner-occupied sample have a high level of education[6]. However, the educational level of the rent sample is lower with 24%. The low level of education is not remarkable as studying used to be less accessible and participants are 55 or older. Full socio-economic data are given in Appendix IV.

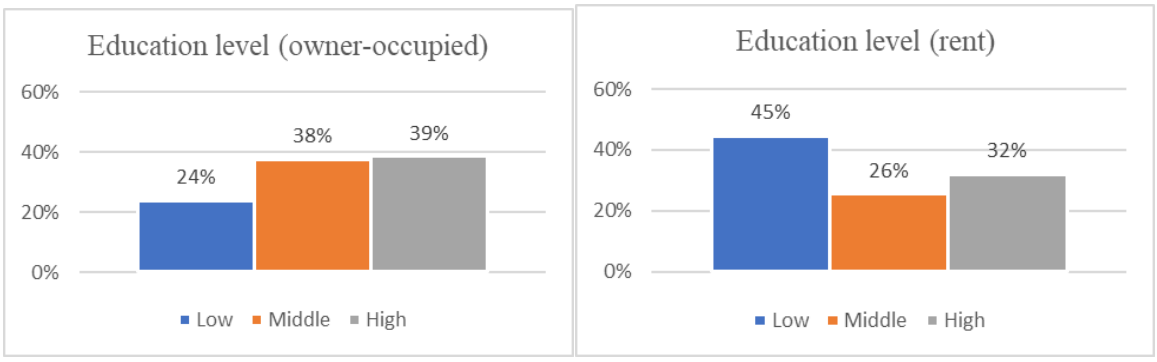
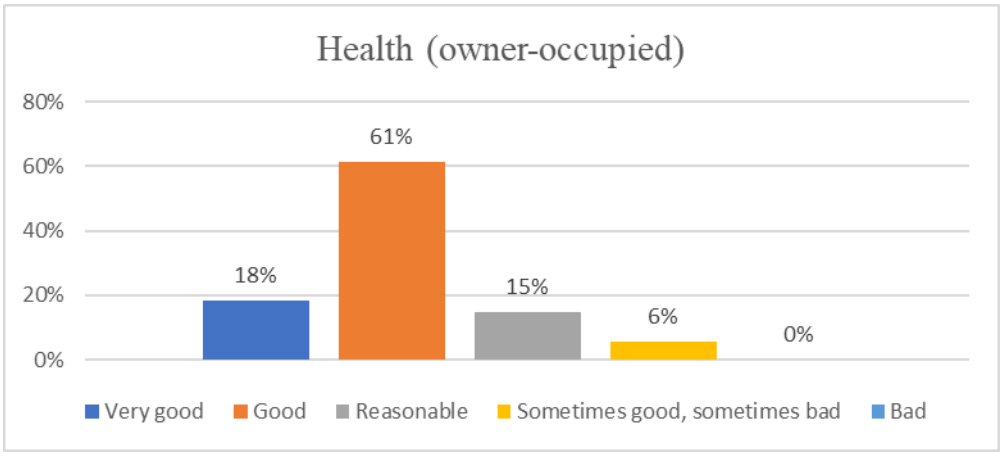


Figure 12: Socio-economic data from sample (educational level)

Data about physical condition in figure 13 show that most participants in owner-occupied sample have good health (61%). The rental and owner-occupied sectors are largely similar, except that in the owner-occupied sector, more people describe their health as “very good” (18%) compared to 9% in the rental sector. In conclusion, only about 20% of both samples perceive their health as not good.



[6] Participants attending University or a University of Applied Sciences, Bachelors or higher.

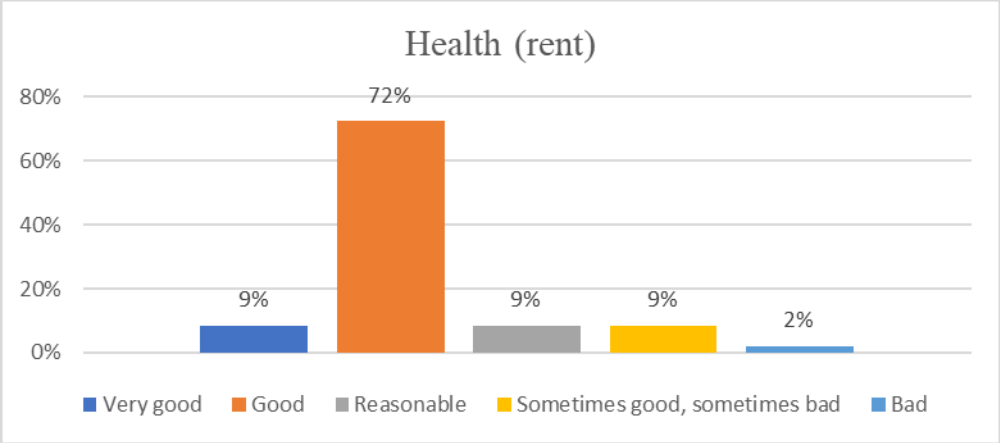
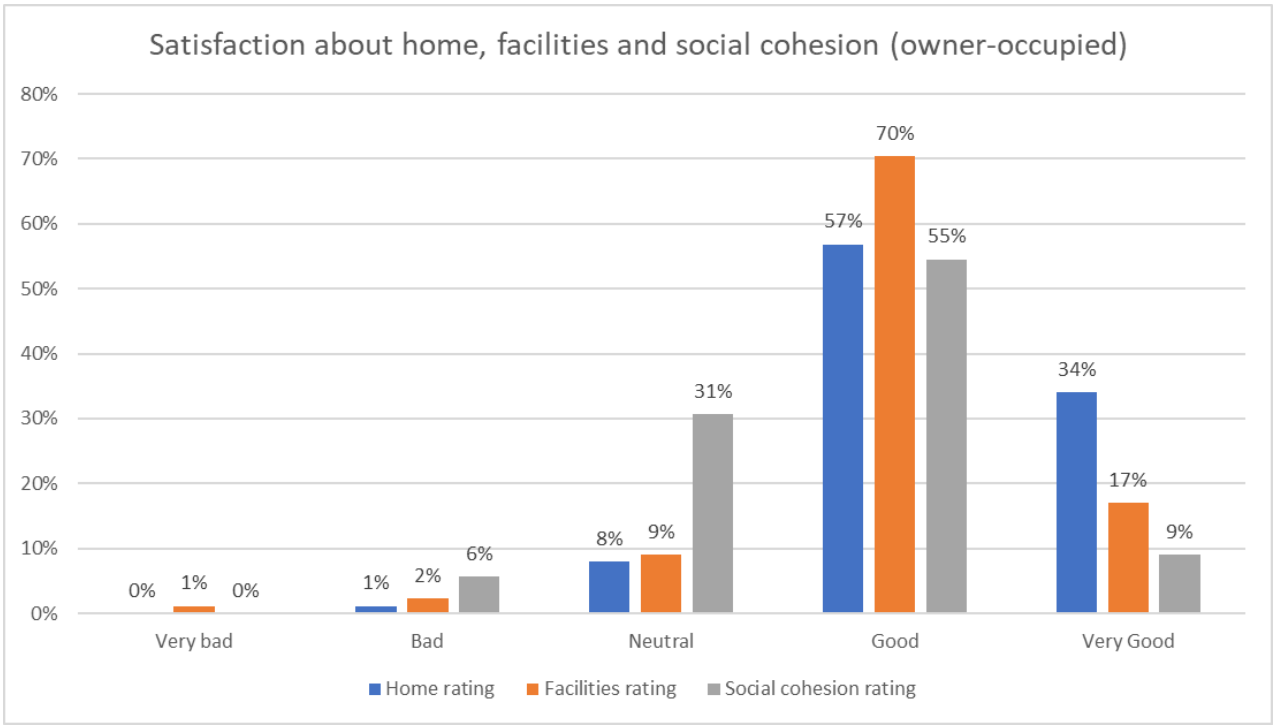


Figure 13:Physical condition data from the sample (health)

The last part describes participants' current satisfaction with their own home and living environment. Figure 14 shows that most respondents from both samples are satisfied with their current home, facilities, and social cohesion within their neighbourhood (e.g., “good” ranges between 49-70% of participants). In addition, 34% of participants in the owner-occupied sample are very satisfied with their home, compared to only 13% in the rental sample. Of the three factors, social cohesion scores lower compared to the home itself and the neighbourhood. Finally, only 1-6% of participants in the owner-occupied sample are dissatisfied with their home, neighbourhood and social cohesion, compared to the rental sample where 9-15% of the people perceives their home, neighbourhood or social cohesion as bad. Since most people are (very) satisfied with the aforementioned three aspects, this may mean that not everyone is ready to relocate immediately.



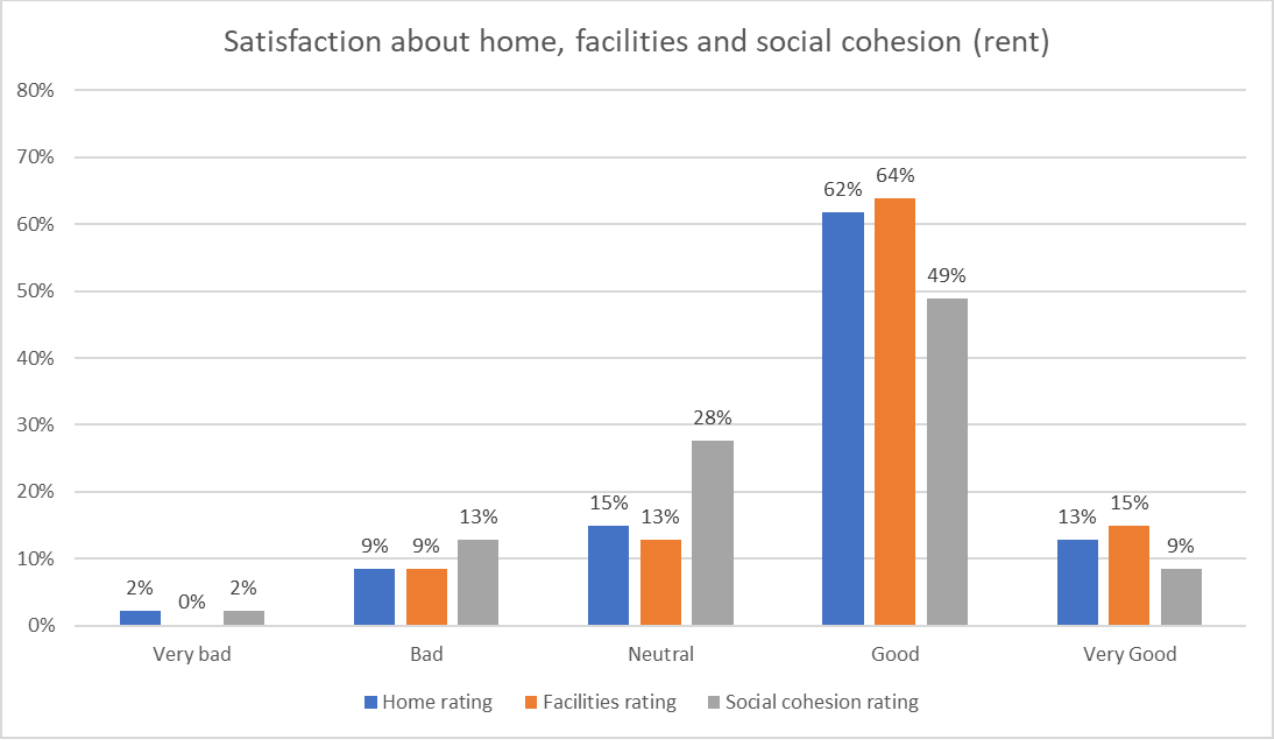
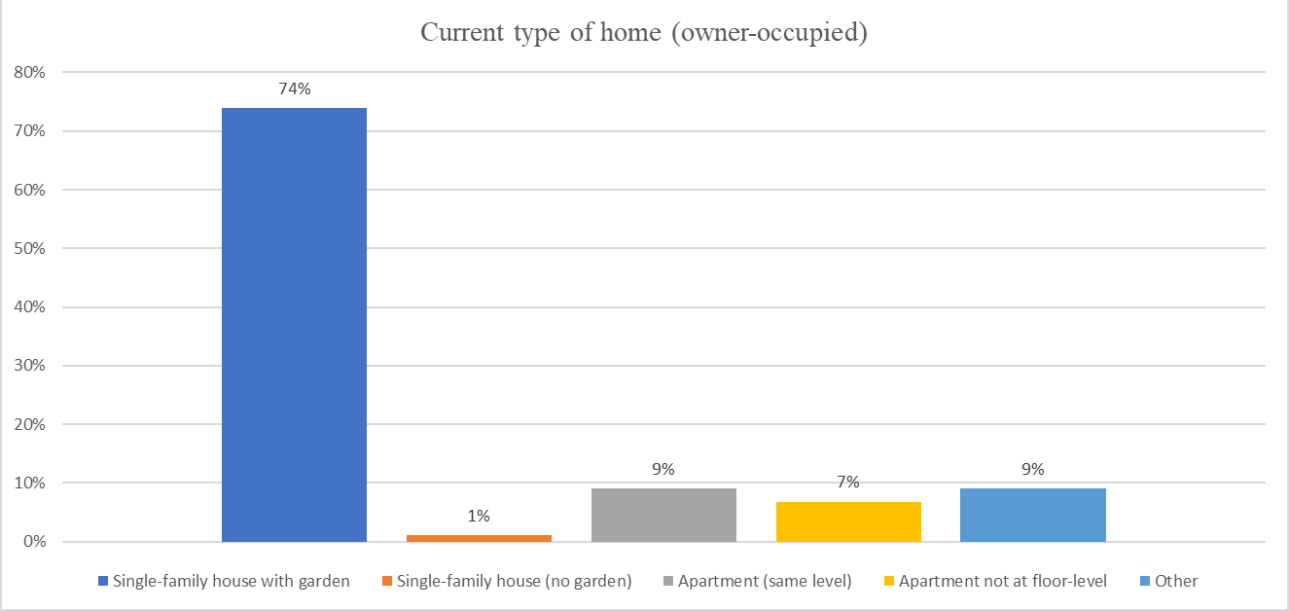


Figure 14:Current satisfaction of home, facilities and social cohesion data from the sample

Figure 15 shows that the vast majority of people in the owner-occupied sample currently live in a single-family dwelling (74%). This is higher compared to the rental sample with only 60%. Furthermore, (nearly) all single-family dwellings do have a garden. The rental sample shows a higher degree of apartments (32%) compared to 16% in the owner-occupied sample.



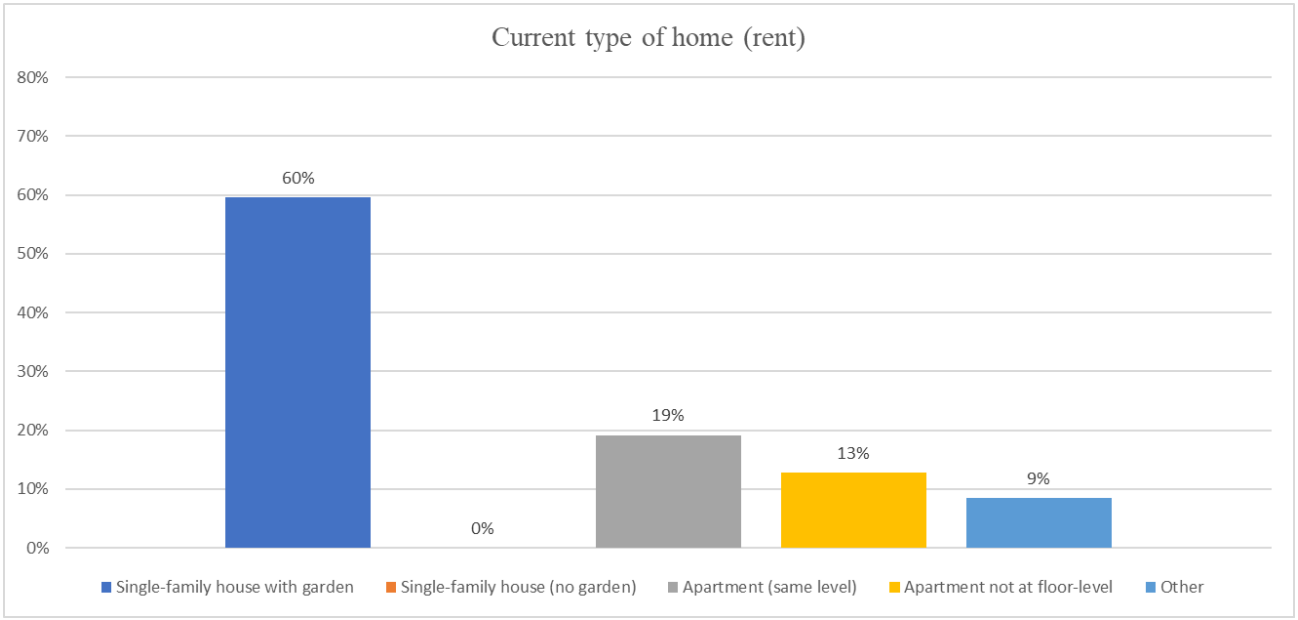
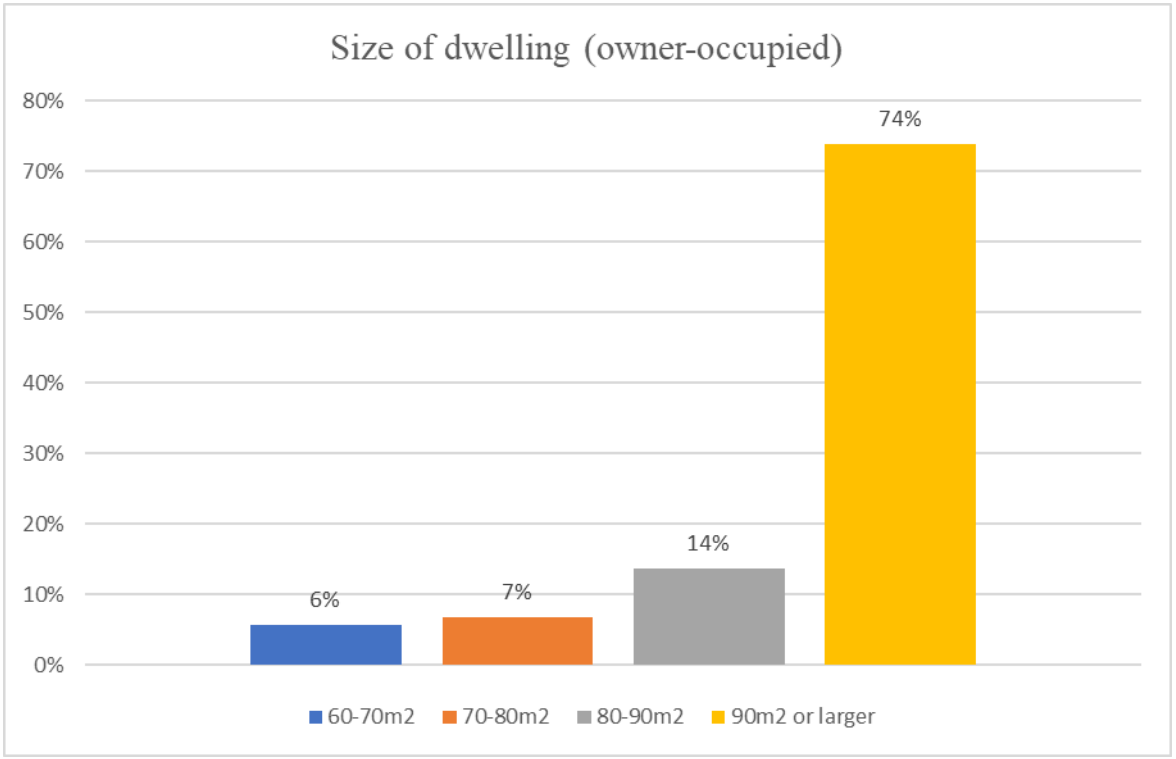


Figure 15: Current type of home

Figure 16 presents the size of the dwellings. It also shows that the houses in the owner-occupied sector are generally larger than 90 m2 (74%), but in the rental sector, on the other hand, this share is only 32% and spread across all sizes. This may mean that respondents, living in rental properties, sometimes already live in smaller and more suitable homes.



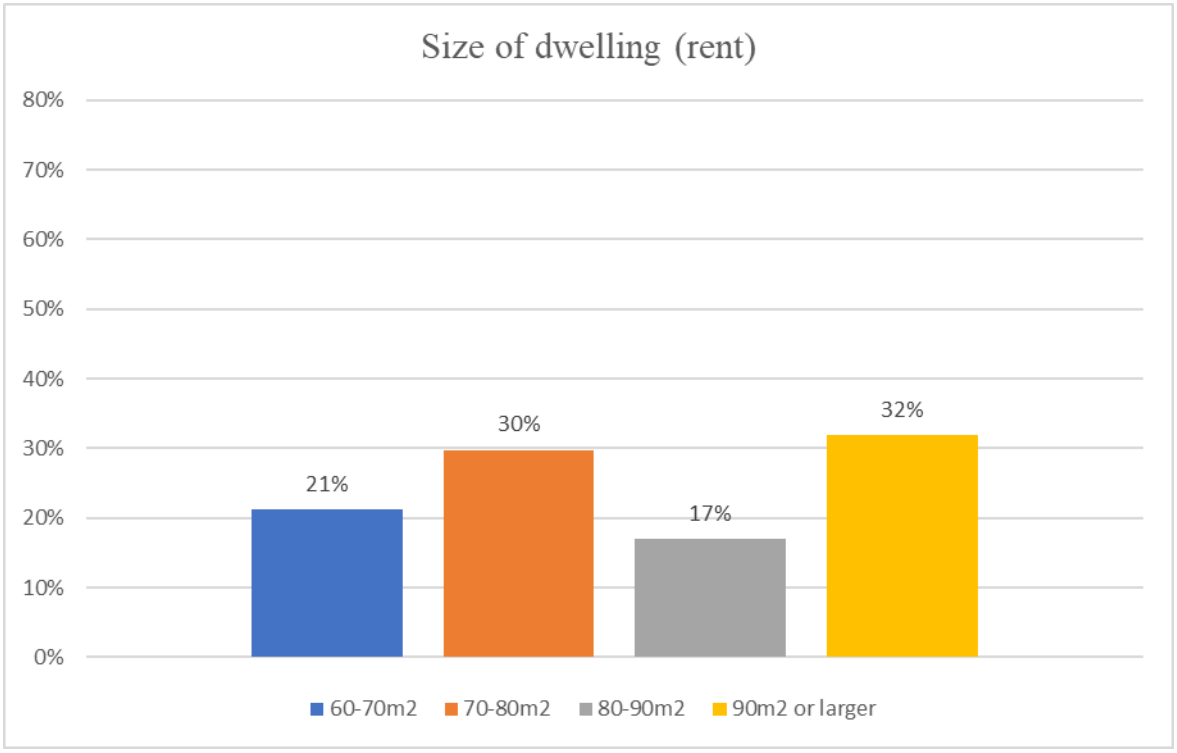
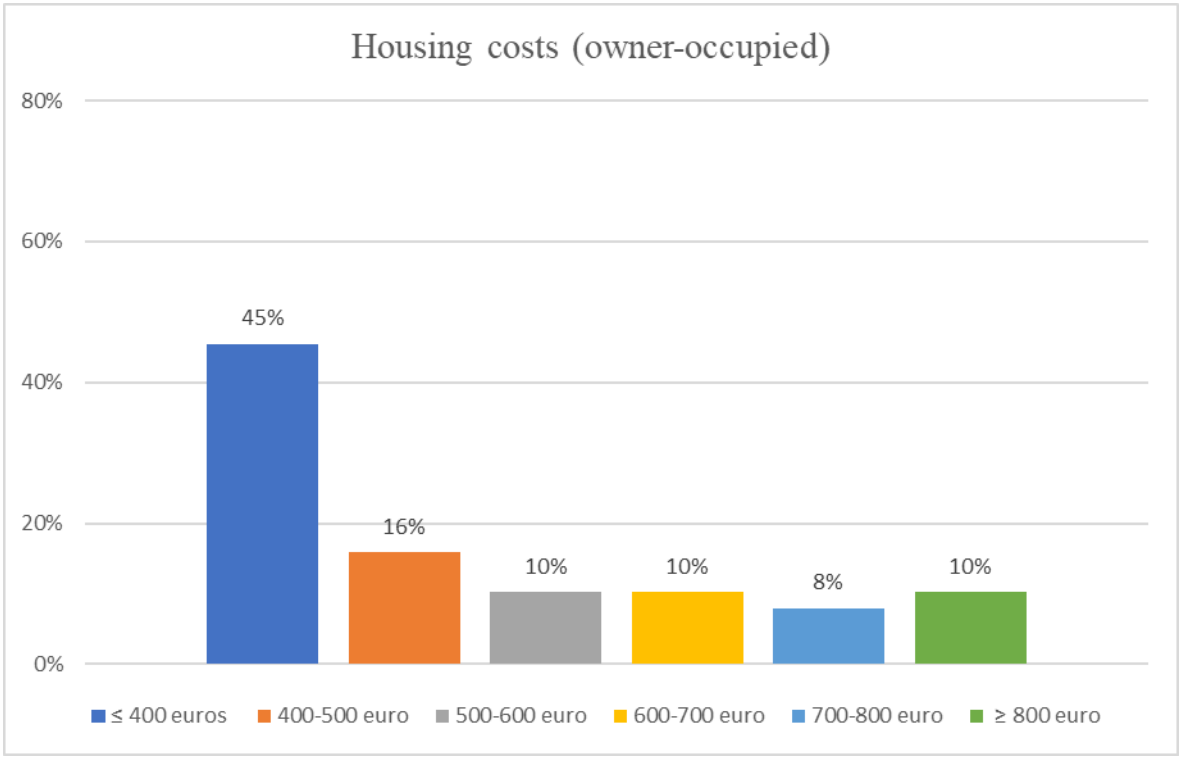


Figure 16: Size of dwelling

Figure 17 shows that participants in owner-occupied dwellings have often already (partly) paid off their mortgage, with 45% having a mortgage below 400 euros. In the rental sector, on the other hand, this is evenly distributed, with many respondents paying more than 600 euros (89%). It is remarkable that no one within the rent sample is paying less than 400 euros, while only 11% of the sample is paying less than 600 euro.



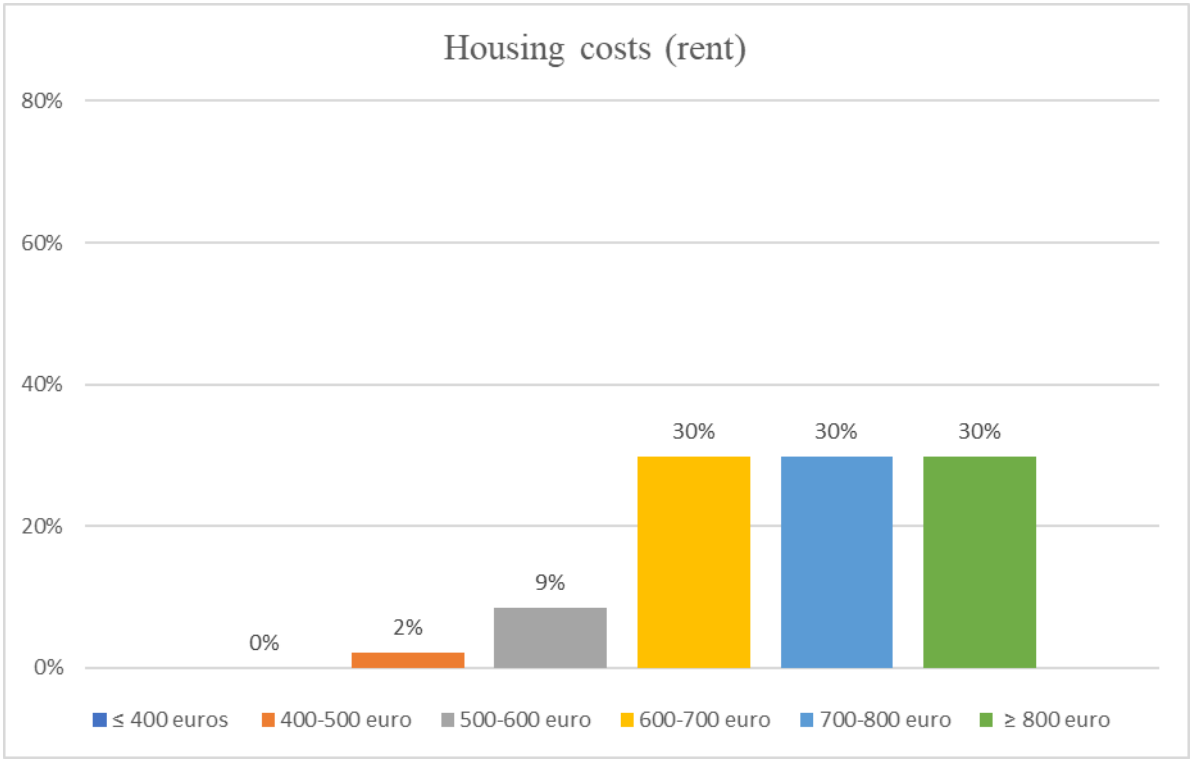
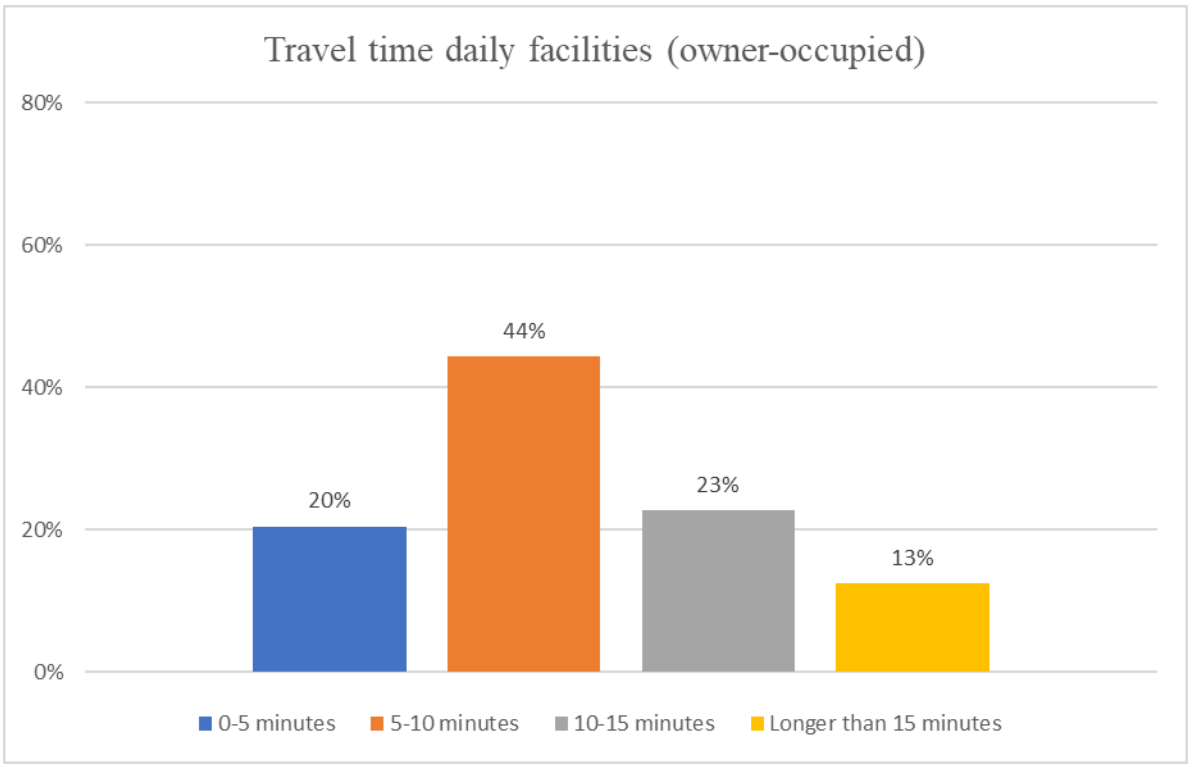


Figure 17: Mortgage and rent levels

Figure 18 shows that most people from owner-occupied sample need between 5 and 10 minutes travel time to get to their daily facilities (44%). This may indicate that many people already live in urban areas. In addition, the travel time within the rental sample is closely distributed between 5 and beyond 15 minutes of travel time. Only 15% has a maximum of 5 minutes.



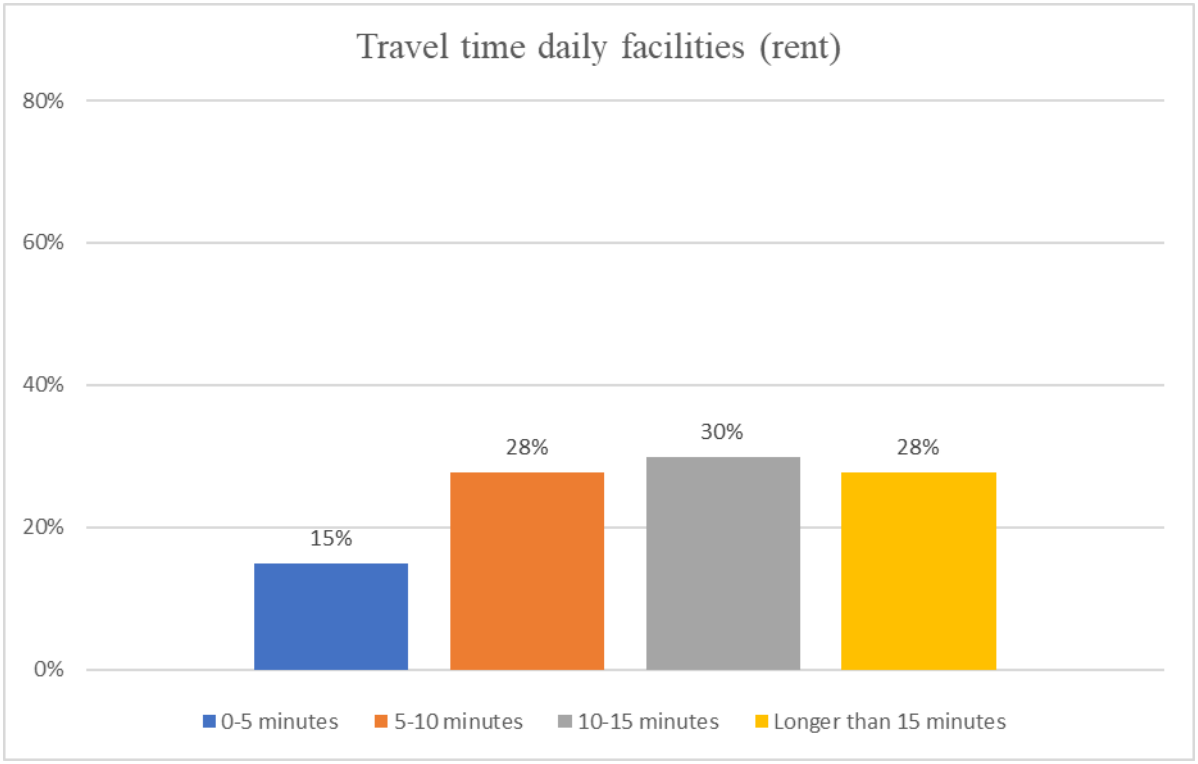
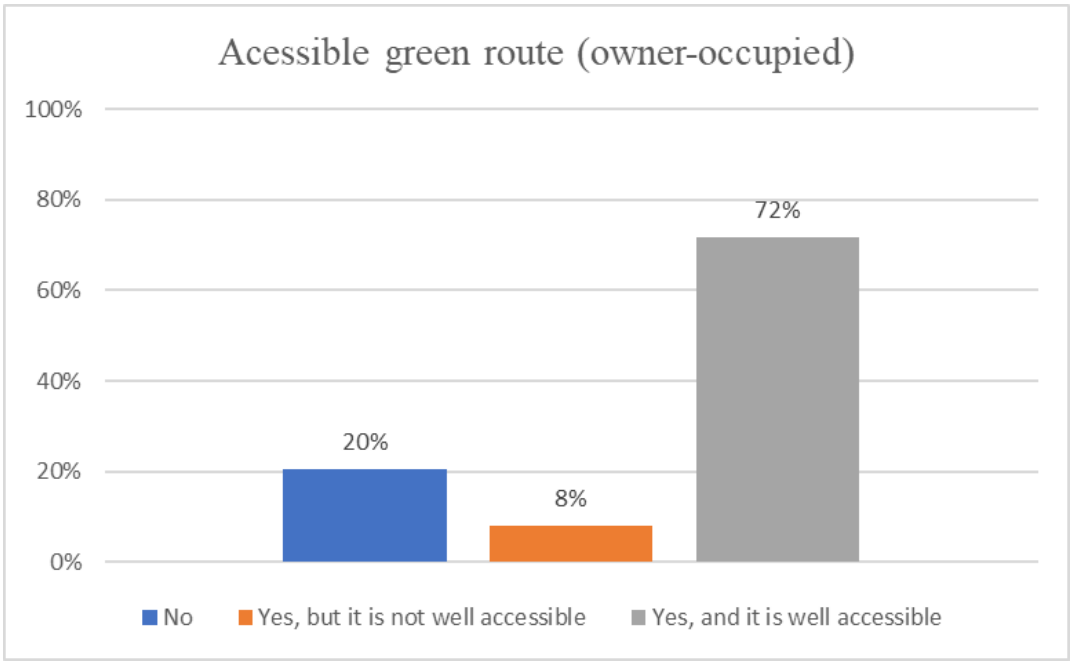


Figure 18: Travel time daily facilities

Figure 19 shows that people within the owner-occupied sample often have a green, accessible route close to their home (72%). 20% does not have a green route and 8% do have, however it is not accessible (e.g. poor road surface, obstacles, poor lighting). The results of the rent sample show similar outcomes.



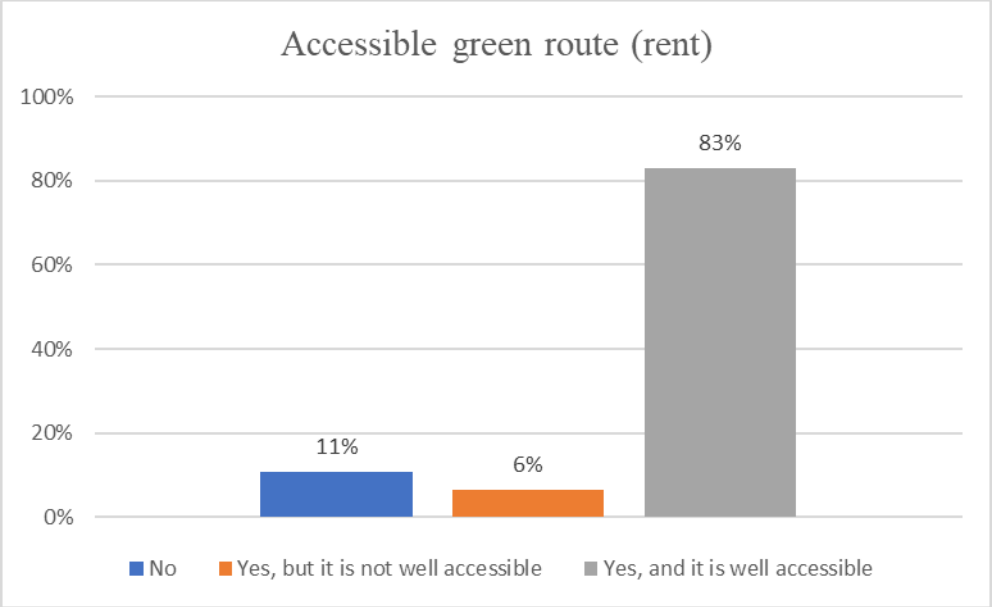
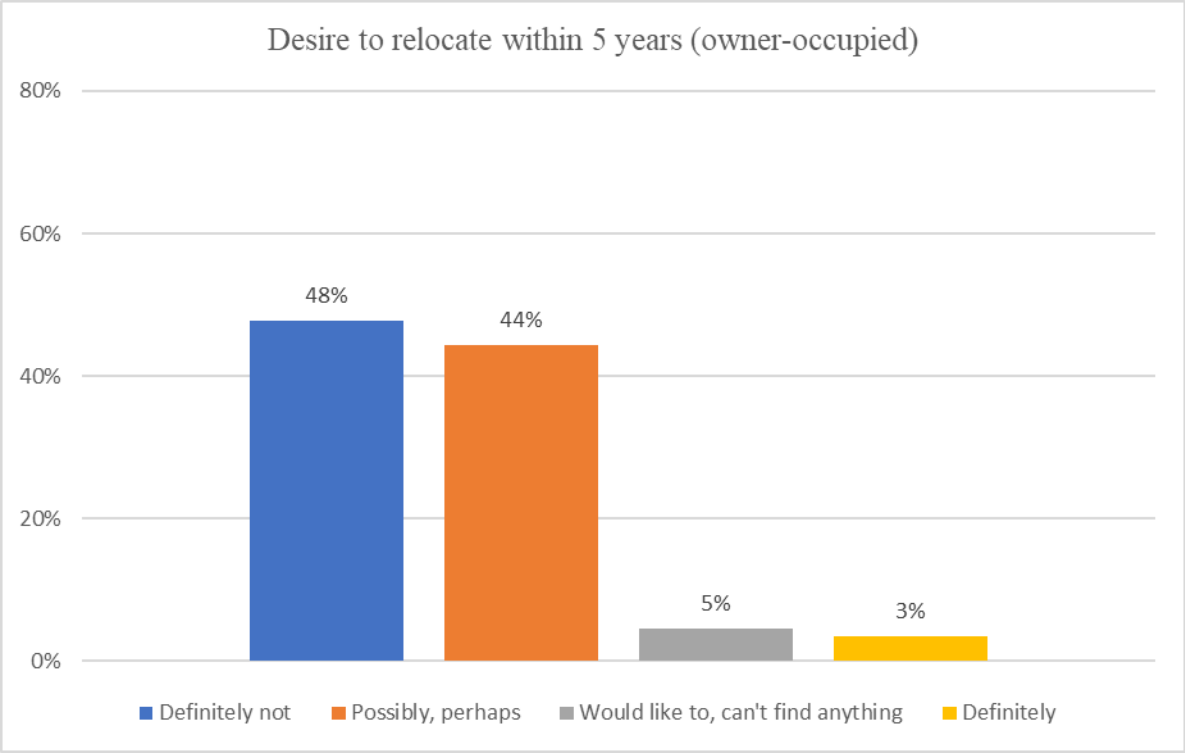


Figure 19: Presence of an accessible green route

Figure 20 shows the willingness to relocate. For the owner-occupied sample, nearly 50% does absolutely not want to relocate in the coming 5 years. 44% of the sample do not rule out relocating one day. The results of the rent sample show different results. Here, nearly 25% is willing to relocate, however, they are not able to find something. In contrary, about 36% definitely do not wish to relocate. In conclusion, results show a higher willingness to relocate for the rent sample compared to the owner-occupied sample.



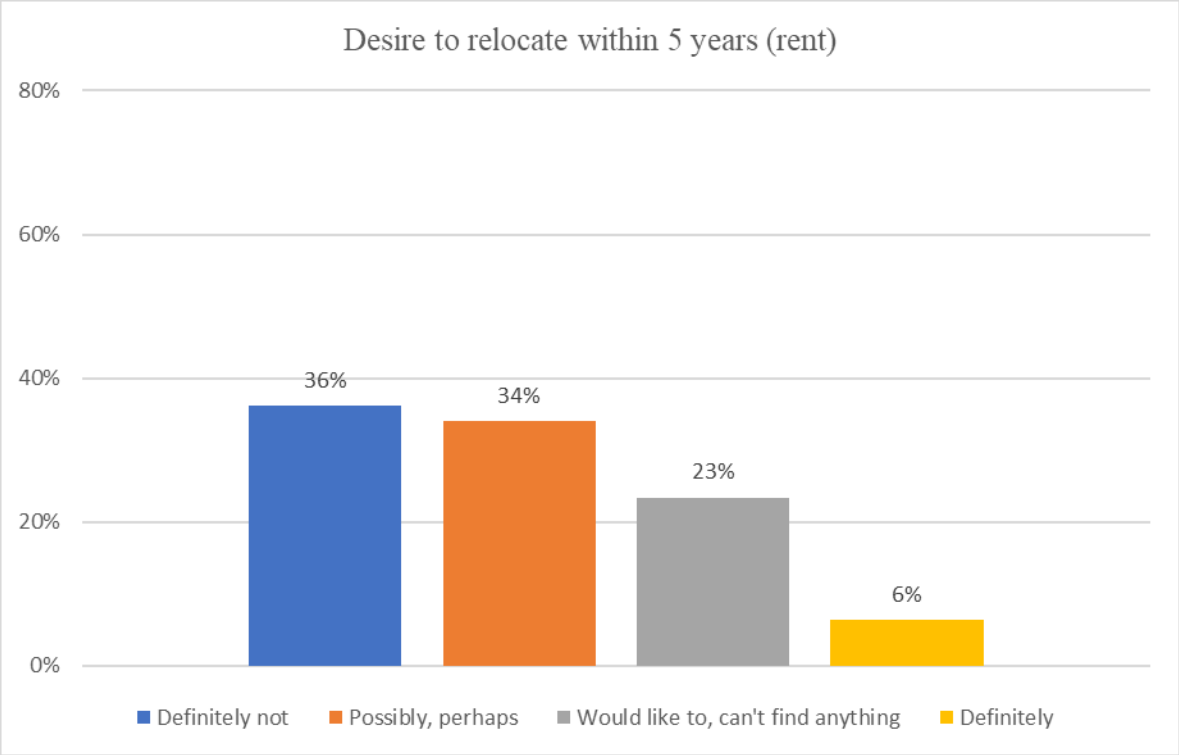
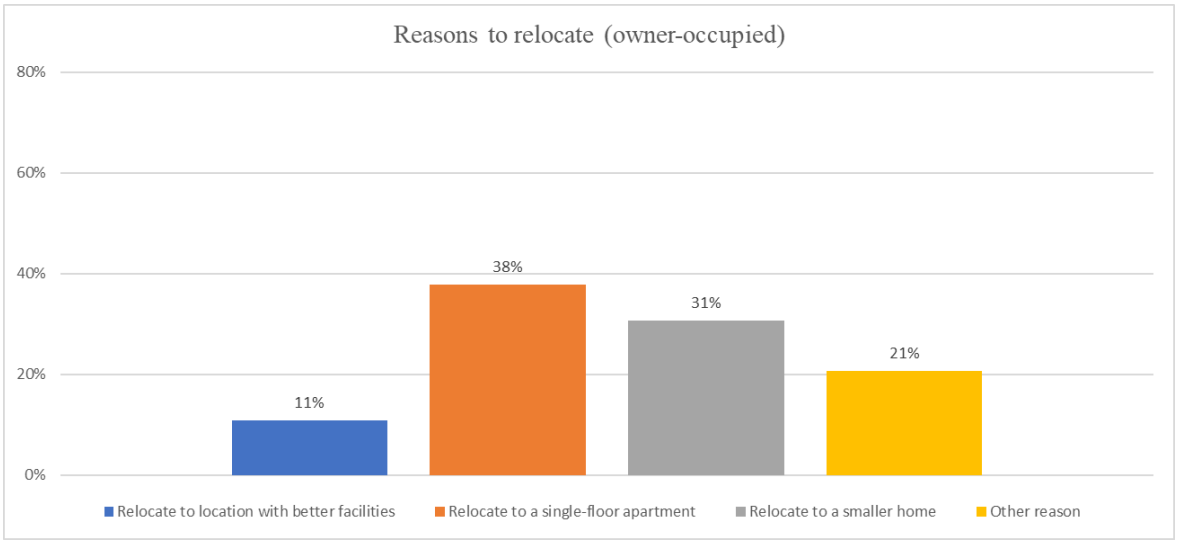


Figure 20: Desire to relocate in the next 5 years

Figure 21 shows several reasons to relocate. Most respondents from both samples indicate that the reason for a possible relocation would be to live in a single-floor dwelling. In addition, 31% of the owner-occupied sample would like to downsize towards a smaller dwelling, with only 15% of the rent sample. This is not remarkable since respondents living in social rental dwelling often already live smaller (Figure 16). The alternative reason for moving is mainly characterised by the desire to live near their children or choose an energy-efficient home. In addition, some seniors want to live in a different neighbourhood, closer to the city centre, or in a location outside urban areas. Some other seniors want to live more rural or want less fixed expenses. Finally, some seniors say they want to move because of the death of their partner and some also say they do not want to move because their current home is already life-proof.



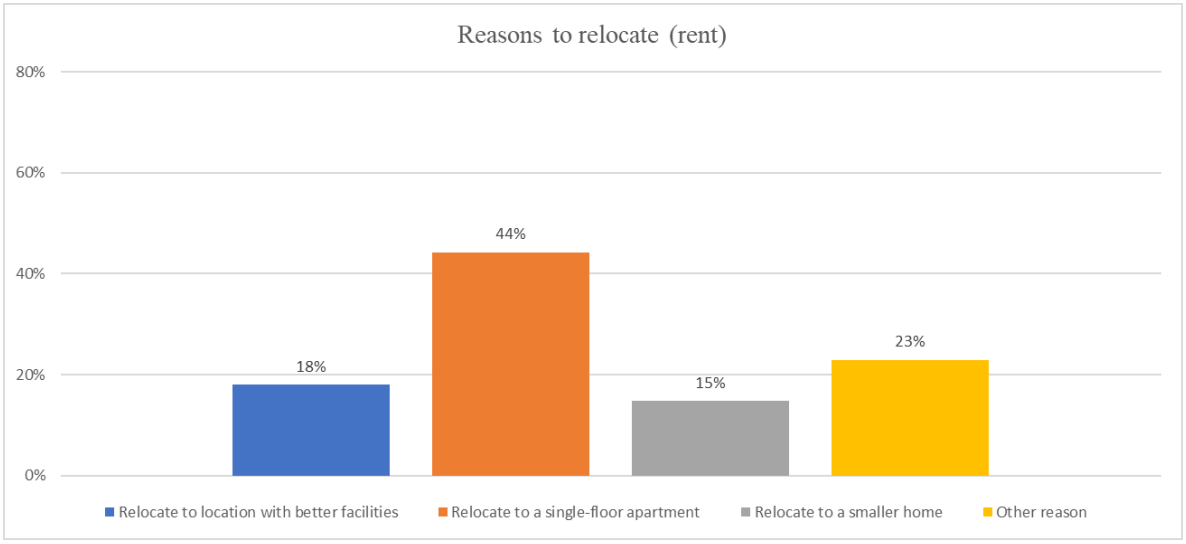
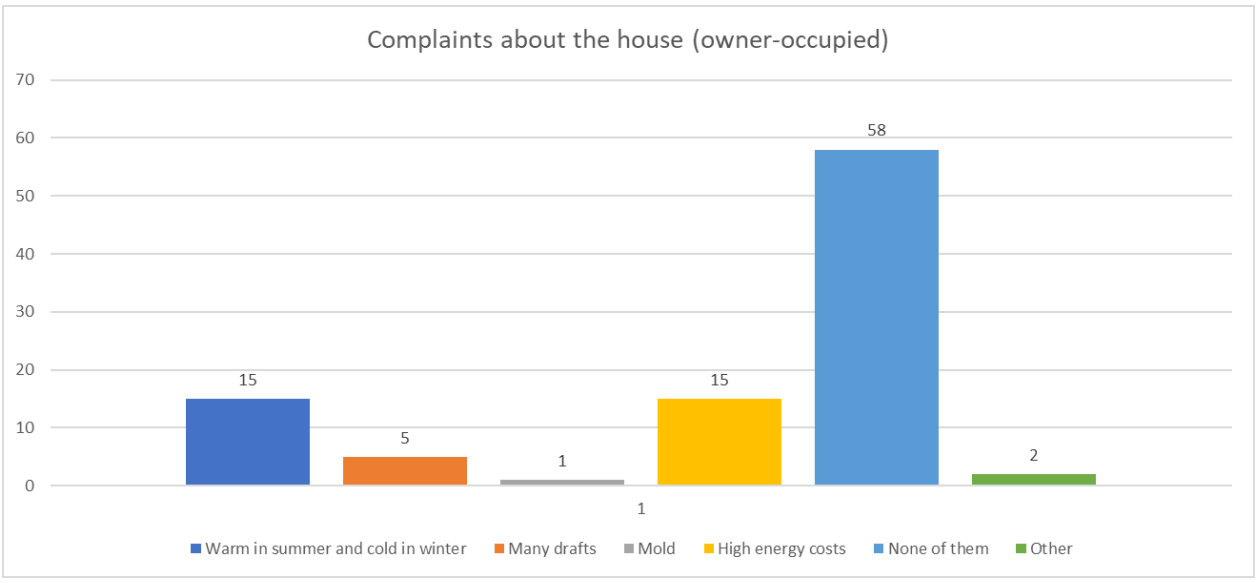


Figure 21: Reasons to relocate

Figure 22 shows the complaints seniors experience about their current home. In both samples, the majority indicate that they have no complaints about the home. In the owner-occupied housing sample, a number of people indicate that their home is too hot in summer and too cold in winter. High energy costs are also noted.

Complaints in the rental sample are more evenly distributed. The results show that many seniors are satisfied with their current home. More information with regards to satisfaction about current home is shown in Appendix IV.



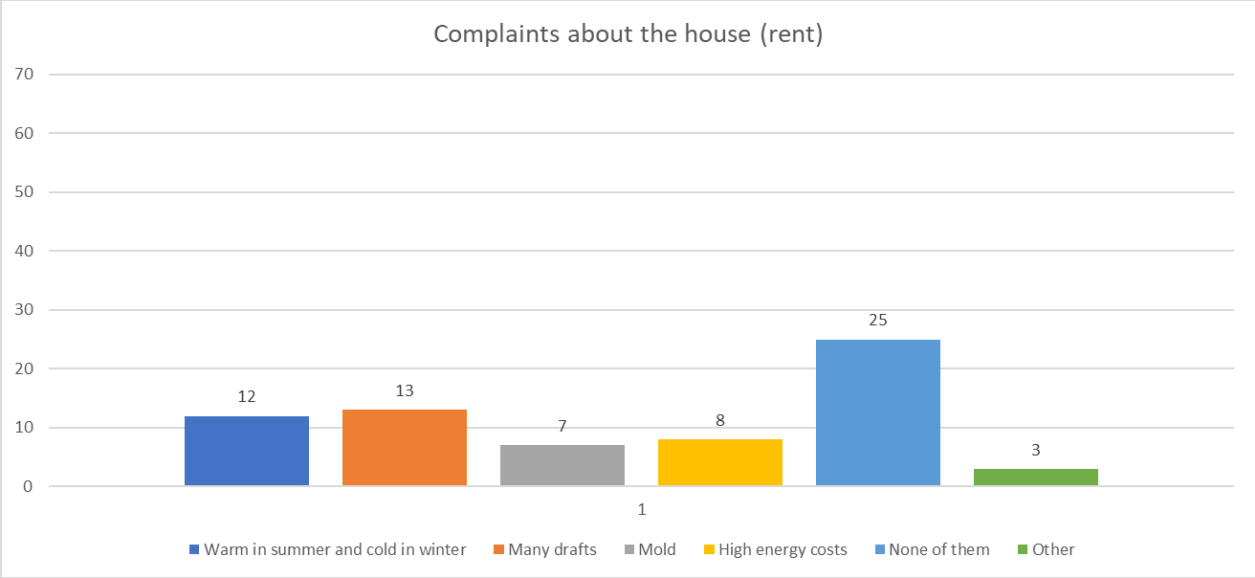


Figure 22: Complaints about the house

7.2. Conclusion

Descriptive statistics were presented in this chapter. The description showed that most participants were 55-65 years old, in good health and rated housing, living environment and social cohesion as good. In addition, most participants lived in a single-family house of more than 90 m2. In the rental sector, the distribution of housing typology was more evenly distributed. Moreover, the data showed that participants with a rental house had higher housing costs than participants with an owner-occupied house, this may be related to the fact that many seniors have already paid off their mortgages. Finally, many participants did not want to relocate, but if they want to move, it is often about wanting to live smaller or on one level.

8. Results of the multinomial logit[7]

This chapter presents a discrete choice model to analyse the stated choice experiment data. First, a multinomial logit model (MNL) is used to analyse how different housing and location attributes affect the willingness to relocate of the seniors. Second, cross-effects within the MNL model are introduced to test the formulated hypotheses.

8.1. Multinomial logit model

Model performance

To estimate the goodness-of-fit, the McFadden's Rho-square (p^2) can be applied. The dependent variable is the choice respondents make. The coefficients (betas) are estimated in a way that the log-likelihood is maximised. A Rho-square between 0.2 – 0.4 indicates a good fit (Hensher and Stopher, 2021). The Rho-square is based on the log-likelihood when the betas (shown in formula 3) are optimised. Formula 5 shows how to determine the rho square:

$$\boldsymbol{p^2 = 1.0 - [\frac{LL(\beta)}{LL(0)}]} \qquad \textbf{(5)}$$

LL (β) log-likelihood using estimated parameters
LL (0) Log-likelihood using null model (all parameters β equal to 0.0)

Owner-occupied- and rent sample

A multinomial logit model (MNL) is used to understand the role of different attributes when deciding to relocate to an alternative home. For all 6 variables level 0 is used as the reference and suboptimal relative to level 1. Table 9 shows the results for the owner-occupied- and rent sample. There are 37 respondents for the rental sample and 88 respondents for the owner-occupied sector. There is an owner-occupied sample because the data for the rental sample was too small. Most coefficients from the owner-occupied sample are statistically significant. The coefficients *green route* and *indoor climate & energy bill* are highly statistically significant (p<0.01). Coefficient "rent" is also significant (p<0.05) and the variables *dwelling location* and *relocation subsidy* are to a lesser extent significant (p<0.1). The variable *daily facilities* is not significant. The outcomes of the coefficients in the MNL model are as expected. However, the option to not relocate "none of these" is positive. This is as expected since only 5% of seniors is relocating on annual basis in the Netherlands (CBS, 2021). However, this coefficient is not statistically significant. The attribute level "yes" for the attribute *walkable green route* has the highest utility, followed by an energy-efficient dwelling (attribute indoor climate & energy bill). Furthermore, living cost has the 3rd highest part-worth utility, relocation subsidy is valued as the fourth, location of the dwelling as the fifth and finally location of daily facilities has the lowest utility. The relative importance of the attributes is visualized in appendix IV

The rent sample, in table 9, shows that coefficient *Relocation subsidy* is highly statistically significant (p<0.01). Furthermore, coefficients *house location* and *housing costs* are also significant (p<0.05). The coefficients *daily facilities*, *walkable green route* and *indoor climate & energy bill* are not significant. The outcomes of the coefficients in the MNL model are as expected. As expected, the option to not relocate

[7] Jointly written

"none of these" is positive. This is not remarkable since only 5% of seniors is relocating on annual basis. In addition, this coefficient is statistically significant (p<0.05). The attribute level "no" for the attribute "relocation subsidy" has the highest utility, followed by an "Rent". Furthermore, location has the 3rd highest utility, energy efficient dwelling is valued as the fourth, green route as the fifth and finally location of daily facilities has the lowest utility. The relative importance of the attributes is visualized in appendix IV.

The final row of table 9 shows that the rho-squared of the MNL model is equal to 0.086 for owners and 0.091 for rent. This means that the model-fit is not high enough ($r^2 > 0.2$) to say that the model adequately describes the choice behaviour of seniors. This also applies for the rho-squared of the rental sample (0.091).

Table 9: MNL model

		Owner-occupied (88 respondents / 352 choice tasks)	**Rent (37 respondents / 148 choice tasks)**
Attribute	**Description**	**Coefficients MNL (Std. error)**	**Coefficients MNL (Std. error)**
Home location (ref l0: outside own neighbourhood)	In own neighbourhood	0.361 (0.178) *	0.571 (0.220) **
Facilities (ref l0: distributed in neighbourhood)	Daily facilities at 5-minute walking distance from the dwelling	0.128 (0.169)	0.015 (0.210)
Well-accessible green walking route nearby (ref l0: no)	Yes	0.873 (0.180) ***	0.177 (0.215)
Indoor climate & energy usage (ref l0: same as current dwelling)	House is energy efficient	0.846 (0.181) ***	0.425 (0.222)
Rent level / mortgage costs (ref l0: increases 100 euro a month)	Remains the same	0.494 (0.163) **	0.596 (0.208) **
Relocation subsidy (ref l0: no)	Yes, a one-off 4000- euro subsidy	0.392 (0.172) *	0.765 (0.224) ***
No alternative		1.598 (0.265)***	0.923 (0.355) **
Rho square		0.086	0.091

*Note 1: Statistical significance: *p<0.1; **p<0.05; ***p<0.01*

8.2. Heterogeneity cross effects MNL

This section examines whether there is heterogeneity among one subgroup in the dataset. As there is insufficient data from the rental sample, the owner-occupied group is used to test for heterogeneity. In addition, section 7.1 revealed that many seniors in the data sample have similar characteristics in terms of: age (55-65), satisfaction with home, neighbourhood and facilities, general health and physical condition. Therefore, only one cross-effect for the green walking route was estimated.

The cross-effects are determined by first creating a dummy variable for whether the respondent had a green walking route nearby and is created as follows: 0 => no green walking route or 1 => yes green walking route. The next step was to create a cross-effect between the dummy variable and the green walking route attribute. The final step was to estimate the cross effects.

As can be seen in table 10, the utility for the group without a green walking route is 0.677, while for the group with a green walking route the utility is 0.677 + 0.273 = 0.95. This indicates that the group without a green route nearby values it less than those with a green walking route. Moreover, compared to the average respondent (0.873), the group with a green route nearby values it more (0.95). However, the cross-effect of the respondents with a green walking route is not statistically significant and therefore equal to 0. Thus, it can be concluded that there is no statistically significant cross effect is found for green walking route.

Table 10: Cross effects MNL model (owner-occupied sample)

Attribute	Levels	Coefficients MNL (Std. error)	Yes, green route
Home location (ref l0: outside own neighbourhood)	L1: In own neighbourhood	0.361 (0.178) *	0.354 (0.178) *
	X person variable	n/a	n/a
Facilities (ref l0: distributed in neighbourhood)	L1: All together	0.128 (0.169)	0.117 (0.169)
	X person variable	n/a	n/a
Green walking route nearby (ref l0: no)	L1: Yes	0.873 (0.180) ***	0.677 (0.276) *
	X person variable	n/a	0.273 (0.292)
Indoor climate & energy usage (ref l0: same as current dwelling)	L1: Yes, house is energy efficient	0.846 (0.181) ***	0.846 (0.181) ***
	X person variable	n/a	n/a
Housing costs (ref l0: increases 100 euro a month)	L1: Remains the same	0.494 (0.163) **	0.493 (0.163) **
	X person variable	n/a	n/a
Relocation subsidy (ref l0: no)	L1: Yes, a one-off 4000-euro subsidy	0.392 (0.172) *	0.390 (0.163) *
	X person variable	n/a	n/a
No alternative		1.598 (0.265)***	1.589 (0.265) ***
	X person variable		
Rho square		0.086	0.106

*Note 2: Significance: *p<0.1; **p<0.05; ***p<0.01*

8.3. Hypotheses testing

This section discusses the findings related to the hypotheses introduced in section 4.2.

Hypothesis 1 stated that relocating within the neighborhood was the most important factor that can overcome the barrier of place attachment. However, for the owner-occupied sample, this hypothesis was not supported since the presence of an accessible green walking route with a coefficient of 0.87 was found to be more important than location with a coefficient of 0.36. Similarly, for the rental sample, the highest coefficient that can overcome the barrier of place attachment was relocation subsidy with a coefficient of 0.765, compared to 0.571 for location.

Hypothesis 2 stated that seniors' preference for location factors (including dwelling location, daily facilities, and accessible green walking route) would have a stronger impact on their decision to relocate than financial incentives (rent and relocation subsidies, based on the VGNB program). For the owner-occupied sample, this hypothesis was supported as the utility of the location coefficients was 1.36 compared to the sum of the financial attributes, which was 0.89. However, for the rental sample, this hypothesis was not supported since the utility of location coefficients was 0.763 compared to the sum of the financial attributes, which was 1.361. In addition, the coefficients for daily facilities accessibility and the presence of a green walking route were not significant and therefore equal to 0, leading to a lower utility for location. Therefore, the utility for financial incentives was found to be more important.

Hypothesis 3 stated that seniors who currently lived near a green accessible walkable route found a green walking route more important than those not living near a green walkable route. For the owner-occupied sample, this hypothesis was supported since the coefficient for living near a green walkable route was 0.95 compared to not living near a green walking route which had a coefficient of 0.68. However, the coefficient of the cross effect was not significant and therefore equal to 0. Unfortunately, for the rental sample, this hypothesis could not be tested due to the unavailability of data.

8.4. Conclusion

The MNL results for owner-occupied sample show that having a green, accessible walking route is perceived as most valuable. Ranking only slightly lower is having an energy-efficient home. Third most important to seniors is the preservation of their housing costs, fourth relocation subsidy, fifth the location of the house and least important to seniors is the location of daily facilities.

The MNL results for the rental sample show that relocation subsidy has the highest utility, followed by Rent. Furthermore, location has the third highest utility, energy efficient dwelling is valued as the fourth, green route as the fifth and finally location of daily facilities has the lowest utility.

Furthermore, a cross-effects was introduced to test hypothesis 3 of section 4.2.

9. Application[8]

This chapter introduces and discusses a tool based on the results of SCE and the MNL model, aimed at housing associations. This tool will give insights in how to interpret the MNL results.

An example of a tool that utilizes the results of the MNL model is presented in Karigar's (2022) study, which focuses on estimating tenants' willingness to accept renovation packages. This tool provides a way to calculate the impact of energy renovation packages, thus increasing tenants' renovation acceptance. Specifically, the probability of choosing the renovation package is estimated, compared to the alternative of not renovating.

Another study that demonstrates the practical application of the MNL model is the study by Ossokina, Kerperien, and Arentze (2021), which examines the willingness of tenants to renovate. In this study, the researchers created four packages based on the attributes used and calculated four possible renovation combinations, which were then compared to the option of not renovating.

This study presents an application similar to those developed by Ossokina, Kerperien, & Arentze (2021) and Karigar (2022). Using the results of the MNL model, this tool will estimate seniors' willingness to relocate. As in Ossokina et al.'s study, the tool will construct several packages based on attributes.

Table 11 shows the relocation packages based on commonly used programs, such as VGNB (a relocation program), Ouderen Hub (a senior hub), and "Langer Thuis Wonen + Ontwerpen" (longer living at home and designing for seniors). Package 1 is a reference model with zero levels for all attributes, representing seniors' willingness to relocate given all attributes zero. Packages 2, 3, and 4 are based on the VGNB program with different attribute combinations. The standard VGNB program offers seniors a relocation subsidy and housing costs, which is included in all VGNB packages. The other attributes are not part of the original program. Package 5 is a development by the municipality of Rotterdam that aims to provide suitable residential concepts and facilities to enable seniors to live independently. Two housing concepts are planned for Prinsenland/Lageland and Hoogvliet in Rotterdam. Seniors may need to relocate outside their neighborhood, but facilities will be nearby. The development of new housing initiatives also provides energy-efficient housing. This package does not consider financial characteristics. Finally, package 6 is based on "Langer Thuis Wonen + Ontwerpen."

[8] Jointly written

Table 11: Relocation packages related to experiment attributes

	Package 1	Package 2	Package 3	Package 4	Package 5	Package 6
Attributes	**Reference package**	**VGNB**	**VGNB + same location & facilities close by**	**VGNB + energy efficient dwelling**	**Senior hub**	**Longer at home + development for seniors**
Home location own neighbourhood	No	No	Yes	No	No	Yes
Facilities	No	No	Yes	No	Yes	Yes
Well-accessible green walking route nearby	No	No	No	No	Yes	Yes
Indoor climate & energy usage	No	No	No	Yes	Yes	No
Housing costs	No	Yes	Yes	Yes	No	No
Relocation subsidy	No	Yes	Yes	yes	No	No

To determine the probability of seniors choosing a specific relocation package, data from the owner-occupied sample was used, as more data and significant coefficients were obtained for this group. It should be noted that this application was developed based on the SCE and its attributes. Consequently, changes in conditions, such as the addition of a third alternative, may alter the results. Since the SCE featured two alternatives and ''none of these'' option, this application was similarly developed. The calculations were performed by determining the utility of a relocation package based on Table 9 for owner-occupied properties. Then, the utility of the two choice alternatives and the no relocation option, namely (1) no relocation, (2) package 1, and (3) relocation package (packages 2 to 6), were calculated. Finally, the exponential of the utility was divided by the sum of the exponential of the two choice alternatives and the ''none of these'' option. A calculation for package 2 is shown below and the rest is shown in figure 23.

- Utility package 2 (Table 9, owner occupied) = 0.494 (rent level) + 0.392 (relocation subsidy) = 0.885.
- Utility two choice alternatives and the ''none of these ''option = 1.597 (Utility not relocating, table 9 owner occupied) + 0 (Package 1) + 0.885 (package 2)
- EXP (0.885) / EXP(1.597) + EXP(0) + EXP(0.885))= 28.98%

See figure 23 for the results of the calculations. These indicate that all relocation programs result in a higher probability of seniors moving compared to the reference model (package 1). The combination of several attributes leads to a higher probability of relocation, with the highest probabilities observed for packages 4 and 5. In package 4, moving to an energy-efficient home was found to be an important factor, which may be attributed to the higher gas and electricity prices during November and December 2022 at the time of collecting the data, making seniors more willing to choose for energy-efficient homes with lower energy costs. On the other hand, the probability of moving is high when implementing a senior hub (package 5), mainly due to the presence of an accessible green walking path with the highest coefficient.

It is important to note that the design of the stated choice experiment was taken into account when presenting the results. The experiment consisted of two alternatives with a ''none of these '' option, where one of the alternatives was always zero for all attributes. Even though the probability of moving was 14%,

it is questionable whether the current dwelling is worse than the reference package (package 1). Furthermore, seniors in the experiment were presented with only two relocation options, whereas in reality, they may have more or fewer options available, leading to a lower / higher probability of moving.

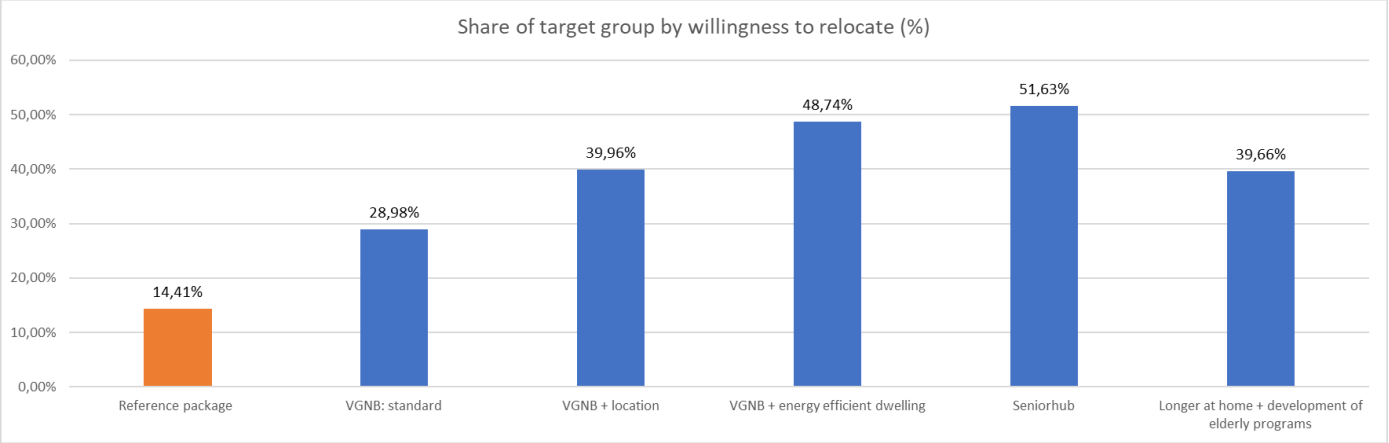


Figure 23: Probability that seniors relocate (%)

In conclusion, this chapter has introduced a tool that uses the results of the MNL model to estimate seniors' willingness to relocate. The tool is designed to assist housing associations, in interpreting MNL results and providing insights on how to increase seniors' relocation acceptance. The tool is based on the SCE and its attributes and has five relocation packages based on commonly used programs. The results show that all relocation programs lead to a higher probability of seniors moving compared to the reference model. The combination of several attributes leads to a higher probability of relocation, with the highest probabilities observed for packages 4 and 5. It is important to note that the design of the stated choice experiment was taken into account when presenting the results, and changes in conditions may alter the results. Overall, this tool provides valuable insights into seniors' willingness to relocate, allowing housing providers to develop more effective policies and programs that meet seniors' needs and preferences.

10. Conclusion and discussion [9]

The world's population is aging. In the Netherlands, a significant number of seniors (about 140,000 out of 2.2 million 65-plus households) live in homes that are not suitable for their needs or require expensive modifications (costing around €10,000). Housing associations own approximately 65% of these homes (Daalhuizen et al., 2019). While relocation is the best solution for seniors living in such homes, a relatively small number of seniors choose to relocate (Kooiman, 2020). The Ministry of Housing and Spatial Planning (2022) reports that seniors are often attached to their homes, neighbourhoods, and people in the neighbourhood, which can create barriers to relocation. The attachment is called "place attachment" and is defined as "a social-psychological process that captures one's emotional connection to their social and physical surroundings". This study aimed to investigate the factors contributing to seniors' decisions to relocate or not. This has led to the main question of this research: "To what extent does place attachment pose a barrier when seniors consider moving to a more suitable house and how can this barrier be overcome?". This research has societal benefits, including increased availability of suitable homes for families, better housing options for seniors, and addressing the housing shortages. Additionally, it has private benefits for seniors, such as reduced falls, fewer hospitalizations, less social isolation and ageing in their own neighbourhood. To answer the main question, a literature review, interviews with 4 housing consultants and 1 Policy advisor Strategy and Communication, a stated choice experiment on 2 samples, 88 owner-occupiers and 47 renters and an application was developed. The stated choice experiment was conducted together with fellow student, see Van Arum (2023).

In this research, the following sub-questions are answered:

1. What is the relevant size of the neighbourhood as perceived by the seniors as related to place attachment?

The literature review revealed that a senior-friendly neighbourhood consists of a physically walkable environment, functional facilities that are close by, and social factors such as neighborhood contacts. A senior-friendly home is one that does not require going up or down stairs and where all primary rooms are on the same living level. Interviews showed that seniors' definition of the neighbourhood depends on their physical condition and social contacts. Seniors with poor physical condition have a smaller neighborhood as they cannot walk or move far. Seniors with more social contacts have a larger neighborhood. Conversely, lonely seniors have a smaller neighborhood.

2. Which house, neighbourhood characteristics and/ or habits determine place attachment and reluctance to move?

The literature review and interviews identified physical and social neighbourhood characteristics, daily routines such as shopping habits, and housing costs as the main factors that influence place attachment and reluctance to move. Physical factors include accessibility to public transport/facilities, walkability of the neighbourhood, and green surroundings. Social factors include having a social network in the neighbourhood, children living nearby, or being able to identify with the neighbourhood's identity.

[9] individually written

3. Which house, neighbourhood characteristics and/ or habits determine place attachment and can stimulate and attract seniors to move?

The literature review and interviews identified that the factors that encourage seniors to relocate are daily activities such as house and garden maintenance, grocery shopping, and home design (stairs), while the factors that attract seniors relate to physical and social characteristics of the neighbourhood and features of the house. Physical characteristics of the neighbourhood that attract seniors include a green, walkable living environment, and amenities. Social features that attract seniors include living closer to children or friends, social activities, and identity. Housing characteristics that attract seniors include a relocation subsidy, turnkey house, relocation subsidy, and housing costs remaining the same.

4. What factors of place attachment do seniors prefer when considering relocation?

The results of the Stated Choice Experiment revealed that seniors with owner-occupied housing consider (1) a green walking route most important, followed by 2) energy-efficient homes, 3) housing costs, 4) location of the house staying the same, 5) financial compensation, and 6) daily amenities nearby.

The results of the Stated Choice Experiment revealed that seniors renting social housing consider (1) financial compensation as most important, followed by (2) housing costs, 3) location of the house staying the same, (4) energy-efficient homes, (5) green walking route, and (6) daily amenities nearby.

Hypothesis 1: **Seniors find attachment to neighbourhood the most important relocation characteristic**

We do not find support for this hypothesis based on owner-occupied and rental samples. Although results indicate that seniors attach a high value to staying in their own neighbourhood, this attribute is not the most important. Seniors are willing to move to another neighbourhood if there are sufficient other attractive features to the new house and location. An example is a well accessible green walking route nearby.

Hypothesis 2: **Seniors' preference for location factors (including dwelling location, daily facilities accessibility, and accessible green walking route) will have a stronger impact on their decision to relocate than financial incentives (rent and relocation subsidies, based on the VGNB program).**

No unambiguous answer is found here, so it depends on which financial and location characteristics are included in the offered relocation package. For example: predicted willingness-to-relocate for a relocation package including attractive location characteristics (stay in own neighbourhood, clustered daily amenities next door and well accessible green walking route in front of the house) is 39.66%. Predicted willingness-to-relocate for a relocation package with attractive financial characteristics (living costs remains the same after moving and there is a one-time relocation compensation of 4000 euro) is lower, 28.98% only. However, if the financially attractive package is extended with the attribute 'new home is energy-efficient', which also affects finances, the predicted willingness-to-relocate increases to 48.74%, which is higher than the 39.66% for the package with attractive location characteristics only.

Hypothesis 3: Seniors who live currently near a green accessible walkable route find a green walking route more important than for those not living near a green walkable route

We find no support for this hypothesis. This result is inconclusive, as our data sample is too small to allow for heterogeneity analyses.

5. What attributes (and attribute levels) should be prioritized by housing associations to reduce the barrier of place attachment among seniors, and thereby increase their willingness to move to a new location?

In this study, different relocation packages were identified to show which combination of attributes would increase the probability of seniors moving, based on the results of the stated choice experiment. These packages are shown in table 11 and the probability of seniors' willingness to relocate are shown in figure 23. The results show that all relocation programs lead to a higher probability of seniors moving compared to the reference model. The combination of several attributes leads to a higher probability of relocation, with the highest probabilities observed for packages 4 and 5.

The main research question of this report was: *To what extent does place attachment pose a barrier when* seniors decide not to move *to more suitable housing, and how can this barrier be overcome?*

According to CBS (n.d.), seniors have a low willingness to relocate. This suggests that place attachment can pose a barrier when seniors consider moving to a more suitable house. To overcome this barrier, a combination of factors must be considered, including financial aspects. It is important to properly analyze the potential new living environment to determine whether it meets the seniors' needs and desires. Simply offering a desirable location may not be enough to encourage relocation. By taking a comprehensive approach, the willingness of seniors to relocate can be increased.

Implications

Using the results from the tool, recommendations for implications for policy making are focus on developing and maintaining green walkable route, financial incentives and focus on factors combined together in order to increase the probability of relocating.

The first implication for policy making is to focus on green walkable routes. This could include developing and maintaining accessible green walking routes. By creating more walkable and accessible walking routes, policymakers can help seniors to stay healthy and active aging and increase the willingness to relocate.

Secondly, policies should consider financial incentives for seniors to relocate, as financial factors may be a key barrier to relocation. This may involve providing financial assistance to seniors to help with the costs of moving, or offering that the housing costs stay the same.

Finally, an important implication for policy making is to focus on combining factors, such as financial incentives and green walking routes, to improve seniors' willingness to relocate. As demonstrated by the results of the tool, the probability of relocation was increased when multiple factors were considered. Therefore, it is recommended to combine multiple factors to increase seniors' willingness to relocate. In addition to the aforementioned factors, such as relocating within the same neighborhood, could also be considered. By taking a multi-faceted approach to addressing barriers to relocation, policymakers can improve the probability of relocating.

Limitations & future research

Firstly, no focus group discussions were conducted with seniors, despite the initial intention to do so. This was due to difficulties in finding participants. As a result, the study lacked insights into the characteristics that seniors find important.

Secondly, the attributes used in the study were not all related to the study of place attachment. For example, the energy attribute was not relevant to this research, and social aspects were not adequately

reflected. This was a limitation, as better insights could have been gained for the barrier of place attachment if the attributes were based solely on this study.

Finally, the heterogeneity of the collected data was a limitation. The study aimed to reach seniors who rent in the social sector and talks were held with 8 housing associations and 1 property developer, but 7 housing associations and the property developer dropped out, making it difficult to reach the intended target group. To overcome time constraints, seniors with owner-occupied houses were included in the study, potentially leading to different insights than if the survey had been conducted among only social tenants. Additionally, the data showed that a large proportion of participants were aged 55-65, married couples, Dutch, and in good physical condition. A more diverse target group could have led to different insights.

Based on the above limitations, it is therefore recommended that future research should conduct a stated choice experiment on only factors that have a relationship with place attachment. Here, for example, attributes such as living closer to children or relatives, social activities and identity of environment could be investigated. This would allow to give a better advice on which aspects have more influence on place attachment. It would also be interesting to conduct a stated choice experiment with only seniors who live in a social sector house. This could possibly lead to purer results becoming available.

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Appendix I Approval letter

Mr. Ashwan Rampersad
a.rampersad@student.tue.nl

TU/e
EINDHOVEN UNIVERSITY OF TECHNOLOGY

Date
June 16, 2022

Reference
ERB2022BE30

Ethical Review Board TU/e

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Ethical review research proposal

Dear Mr. Rampersad,

It is a pleasure to inform you that the Ethical Review Board (ERB) has discussed and approved your application "Importance of place attachment for seniors' relocation".

The Board wants to draw your attention to the terms and conditions in the appendix.

Success with your research!

Sincerely,

Dr. D. Lakens
Chair Ethical Review Board TU/e

Enclosures
1

The ERB retains the right to revise its decision regarding the implementation and the WMO[1]/WMH[2] status of any research study in response to changing regulations, research activities, or other unforeseen circumstances that are relevant to reviewing any such study. The ERB shall notify the principal researcher of its revised decision and of the reasons for having revised its decision.
[1]WMO: Law on Medical Scientific Research involving Human Beings (in Dutch: Wet medisch-wetenschappelijk onderzoek met mensen)
[2]WMH: Medical Device Directive (in Dutch: Wet op de medische hulpmiddelen)

Appendix II Questionnaire survey

Choice game

Choice game accessible living

When one gets older, good accessibility of the home and surroundings becomes very important. Accessible living can be arranged in various ways. Your housing association would like to figure out which ways the tenants find best. We invite you to think about this together.

TU Eindhoven has developed for this a game-of choice. In the game you get 4 times a choice from 2 different accessible homes. We ask you to indicate which one you would consider relocating to. You may also choose neither. We also ask a few questions about yourself. All answers will be processed anonymously and kept confidential.

Participation only takes 15 minutes. Your input will help housing associations develop better housing concepts for seniors.

Please take the time to read the explanations carefully. If you have any questions, please send an email to Ashwan Rampersad & Juriën van Arum, master students at TU Eindhoven: a.rampersad@student.tue.nl (mailto:a.rampersad@student.tue.nl) or j.v.arum@student.tue.nl (mailto:j.v.arum@student.tue.nl).

Many thanks in advance for your participation!

✱This game is not shown properly on a telephone. In case you are logged in on a telephone, would you please switch to a computer or tablet (ipad).

On which devide are you participating?

❗ Choose one of the following answers

○ Computer	○ Tablet or ipad	○ Telephone

Consent form

✱First of all, thank you for participating. But before you start, we need your consent. Please read the following statements and the Consent form (/upload/surveys/798436/files/Consent%20form.pdf) thoroughly. If you understand and agree with them, please give your consent. Please notice: if you do not consent, you will leave this questionnaire. The questionnaire takes about 15 minutes to complete.

- I agree with participation of this research
- I read the consent form. I was able to ask question. I have had enough time to decide whether I wanted to participate.
- I know that participation is voluntary. I also know that I can decide to quit at any moment.
- I give permission to collect and use my data to answer the research question
- I give permission to storage of aggregated anonymized information from this research in data-archives, to be used for replication purposes and future research.

❗ Choose one of the following answers

○ I agree and wish to participate

Some questions about yourself and your dwelling (1/3)

We will now ask some questions about yourself.

*What is your age?

Choose one of the following answers

- ○ 55 till 65 years
- ○ 65 till 75 years
- ○ 75 +

*What is your gender?

Choose one of the following answers

- ○ Male
- ○ Female

*What is your household composition?

Choose one of the following answers

- ○ Single
- ○ Couple
- ○ With resident children

✱What is your level of education?

❗ Choose one of the following answers

Please choose...

✱What is your zipcode? (4 digits and 2 letter without space, so for example 1234AB)

❗ Please check the format of your answer.

✱What is your native language?

❗ Choose one of the following answers

| ○ Dutch | ○ Turkish | ○ Moroccan | ○ Surinamese | ○ Other |

Some questions about yourself and your dwelling (2/3)

✱How is your health, in general?

❗ Choose one of the following answers

- ○ Very good
- ○ Good
- ○ Reasonable
- ○ Sometimes good, sometimes not
- ○ Bad

✱Are you restricted in your normal daily activities, because of health reasons?

❗ Choose one of the following answers

- ○ Severely restricted
- ○ Somewhat restricted, not much
- ○ Not restricted at all

✱Is your partner restricted in his/her normal daily activities, because of health reasons?

❗ Choose one of the following answers

- ○ Severely restricted
- ○ Somewhat restricted, not much
- ○ Not restricted at all
- ○ I do not have a partner

✱How easy can you enter or leave your dwelling from the street?

❗ Choose one of the following answers

- ○ Without effort
- ○ Some effort
- ○ Great effort
- ○ Only with help from others

✱Can you walk the stairs?

❗ Choose one of the following answers

- ○ Without effort
- ○ Some effort
- ○ Great effort
- ○ Only with help from others

✱How long can you walk without having to take a break to rest?

❗ Choose one of the following answers

- ○ Maximum of 5 minutes
- ○ Maximum of 15 minutes
- ○ More than 15 minutes

✱In general, how satisfied are you with your life? On a scale from 1 to 10, what would you rate it?

❗ Choose one of the following answers

Please choose...

Some questions about yourself and your dwelling (3/3)

✱Would you please give your opinion about your house and neighbourhood

	Very bad	Bad	Neutral	Good	Very good
How do you rate your dwelling?	○	○	○	○	○
How do you rate facilities in your neighbourhood (shops, health care, recreation)?	○	○	○	○	○
How do you rate social cohesion in your neighbourhood?	○	○	○	○	○

✱What type of home do you currently live in?

ⓘ Choose one of the following answers

- ○ Single-family house (e.g. terraced house) with garden
- ○ Single-family house without garden
- ○ Apartment (same level)
- ○ Apartment (different levels)
- ○ Other

✱How large is your current home?

❗ Choose one of the following answers

- ○ 70-80 m²
- ○ 80-90 m²
- ○ 90-100 m²
- ○ > 100 m²

✱What is your current rent price?

❗ Choose one of the following answers

Please choose...

✱Do you receive rent allowance?

❗ Choose one of the following answers

- ○ Yes
- ○ No

✱Do you have any of the following complaints about the house? [multiple answers possible]

ℹ Check all that apply

- ☐ House too warm in summer and too cold in winter
- ☐ House has drafts
- ☐ House has mold
- ☐ Too high energy costs
- ☐ None of these
- ☐ Other:

✱How long is the walking time to supermarket/ family doctor/ public transport (mention the longest time)

ℹ Choose one of the following answers

- ○ 0 - 5 minutes
- ○ 5 -10 minutes
- ○ 10 - 15 minutes
- ○ Longer than 15 minutes

✱Is there a green walking route near your home? (A route of about 15 minutes along trees/grass.)

ℹ Choose one of the following answers

- ○ No
- ○ Yes, but it is not well accessible (bad pavement, obstacles, bad lighting, too narrow, etc.)
- ○ Yes, and it is well accessible

✱How long have you currently lived in your home ?

ℹ Choose one of the following answers

- ○ 0 - 5 years
- ○ 5 - 10 years
- ○ More than 10 years

✱Do you want to relocate within five years?

ℹ Choose one of the following answers

- ○ Definitely not
- ○ Eventually yes, maybe
- ○ Would like to, can't find anything
- ○ Definitely yes

✱What would be the important reasons for you to relocate? [multiple answers possible]

ℹ Check all that apply

- ☐ Relocate to location with better facilities
- ☐ Relocate to a single-floor apartment
- ☐ Relocate to a smaller home
- ☐ Other:

Example Game-of-choice

Please imagine that you can participate in a relocation program from your own housing association. You could then relocate without a waiting list to a senior-friendly apartment of 70m2 with a medium-sized balcony. The property is located in an apartment complex with lift and a bus stop just outdoors. It is suitable to live in until old age (wide doorways, barrier-free, walk-in shower etc).

In the next pages, you will be given four choices of two dwellings from this program. We ask you to indicate which of the two you would consider relocating to. You can also choose not to relocate. The homes proposed differ in: location, living comfort and financial.

Below is an example. You don't have to choose yet.

Housing characteristic	**Appartment 1**	**Appartment 2**
Location		
Where is the new home located?	In own neighbourhood (on walking distance from current home)	Outside own neighbourhood
Where are the facilities? (Supermarket/ doctor/ -community house)	Spread through the neighbourhood on walking distance	All clustered together just outside your front door
Is there a well-accessible green walking route nearby?	No	Yes
Living comfort and Financial		
How is the indoor climate & energy usage?	Energy-efficient home (cooler in summer, warmer in winter, less draft and lower energy bill)	Same as now
What will be my new rent?	Rent goes up 100 euros a month	The rent remains the same
Is there a relocation subsidy?	No	Yes, one time 4000 euros

Please click **Next** and the game will start!

Game of choice Accessible living

***Choice 1/4**

Below you see two houses. Both are senior-friendly apartments of 70m2 with a middle large balcony, suitable to live in until very old age. Both are located in an apartment complex with lift and a bus stop in front.

Which one would you consider moving to?

	Apartment 1	Apartment 2
Location		
Where is the new home located?	In own neighbourhood (on walking distance from current home)	In own neighbourhood (on walking distance from current home)
Where are the facilities? (supermarket/ doctor/ community centre)	Spread through the neighbourhood on walking distance	All clustered together just outside your front door
A well-accessible green walking route nearby?	Yes	No
Living comfort and Financial		
How is the indoor climate & energy use?	Energy-efficient home (cooler in summer; warmer in winter; less draught and lower energy bill)	Energy-efficient home (cooler in summer; warmer in winter; less draught and lower energy bill)
What will be my new rent?	Rent stays the same	Rent goes up 100 euro a month
Is there a relocation subsidy?	No	No

Choose one of the following answers

○ Apartment 1 | ○ Apartment 2 | ○ None

Appendix III experimental design

Alternative	Profile	Location	Facilities	Walking rout	Indoor climate & energy usage	Rent	Relocation subsidion
1	000000	Outside own neighbourhood	Distributed in the neighbourhood; everything within 15 minutes' walk	No	The same as current dwelling	Rent /mortgage costs goes up Remains the same00 euros a month	No
2	011001	Outside own neighbourhood	All together; a 5-minute walk from the dwelling	Yes	The same as current dwelling	Rent /mortgage costs goes up Remains the same00 euros a month	Yes
3	011010	Outside own neighbourhood	All together; a 5-minute walk from the dwelling	Yes	The same as current dwelling	Remains the same	No
4	000011	Outside own neighbourhood	Distributed in the neighbourhood; everything within 15 minutes' walk	No	The same as current dwelling	Remains the same	Yes
5	001100	Outside own neighbourhood	Distributed in the neighbourhood; everything within 15 minutes' walk	Yes	the house is energy efficient (cooler in summer & warmer in winter, fewer draughts and lower energy bills	Rent /mortgage costs goes up Remains the same00 euros a month	No
6	010101	Outside own neighbourhood	All together; a 5-minute walk from the dwelling	No	the house is energy efficient (cooler in summer & warmer in winter, fewer draughts and lower energy bills	Rent /mortgage costs goes up Remains the same00 euros a month	Yes
7	010110	Outside own neighbourhood	All together; a 5-minute walk from the dwelling	No	the house is energy efficient (cooler in summer & warmer in winter, fewer draughts and lower energy bills	Remains the same	No
8	001111	Outside own neighbourhood	Distributed in the neighbourhood; everything within 15 minutes' walk	Yes	the house is energy efficient (cooler in summer & warmer in winter, fewer draughts and lower energy bills	Remains the same	Yes
9	110000	In own neighbourhood (max. 15 min walking)	All together; a 5-minute walk from the dwelling	No	The same as current dwelling	Rent /mortgage costs goes up Remains the same00 euros a month	No

10	101001	In own neighbourhood (max. 15 min walking)	Distributed in the neighbourhood; everything within 15 minutes' walk	Yes	The same as current dwelling	Rent /mortgage costs goes up Remains the same00 euros a month	Yes
11	101010	In own neighbourhood (max. 15 min walking)	Distributed in the neighbourhood; everything within 15 minutes' walk	Yes	The same as current dwelling	Remains the same	No
12	110011	In own neighbourhood (max. 15 min walking)	All together; a 5-minute walk from the dwelling	No	The same as current dwelling	Remains the same	Yes
13	111100	In own neighbourhood (max. 15 min walking)	All together; a 5-minute walk from the dwelling	Yes	the house is energy efficient (cooler in summer & warmer in winter, fewer draughts and lower energy bills	Rent /mortgage costs goes up Remains the same00 euros a month	No
14	100101	In own neighbourhood (max. 15 min walking)	Distributed in the neighbourhood; everything within 15 minutes' walk	No	the house is energy efficient (cooler in summer & warmer in winter, fewer draughts and lower energy bills	Rent /mortgage costs goes up Remains the same00 euros a month	Yes
15	100110	In own neighbourhood (max. 15 min walking)	Distributed in the neighbourhood; everything within 15 minutes' walk	No	the house is energy efficient (cooler in summer & warmer in winter, fewer draughts and lower energy bills	Remains the same	No
16	111111	In own neighbourhood (max. 15 min walking)	All together; a 5-minute walk from the dwelling	Yes	the house is energy efficient (cooler in summer & warmer in winter, fewer draughts and lower energy bills	Remains the same	Yes

Appendix IV Results SCE

Socio-economic data of sample

Characteristic	Categories	Rental (47 resp.)	Owner-occupied (88 resp.)	Total % Sample (135 resp.)
Age	55-65	50%	74%	66%
	65-75	33%	24%	27%
	75+	18%	2%	7%
Gender	Male	51%	55%	53%
	Female	49%	45%	47%
Household	Single	41%	10%	20%
	Couple	44%	58%	53%
	With resident children	15%	32%	26%
Education level	Low	45%	24%	31%
	Middle	26%	38%	33%
	High	32%	39%	36%
Native language	Dutch	90%	86%	88%
	Not Dutch	10%	14%	12%

Physical condition data of sample

Characteristic	Categories	Rental (47 resp.)	Owner-occupied (88 resp.)	% Sample (135 resp.)
Health level in general	Very good	7%	18%	15%
	Good	74%	61%	66%
	Reasonable	9%	15%	13%
	Good/Bad	9%	6%	7%
	Bad	0%	0%	0%
Restricted in normal daily activities due to health reasons?	Severely restricted	0%	3%	2%
	Somewhat restricted	21%	20%	21%
	Not restricted at all	79%	76%	77%
Partner restricted in his/her normal daily activities due to health reasons?	Severely restricted	4%	0%	1%
	Somewhat restricted	28%	18%	20%
	Not restricted at all	64%	81%	77%
	I do not have a partner	4%	1%	2%
Easiness in entering or leaving your home from the street?	Without effort	93 %	94 %	94%
	Some effort	7%	2%	4%
	Great effort	0%	2%	2%
	Only with help from others	0%	1%	1%

Can you walk the stairs?	Without effort	79%	84%	82%
	Some effort	21%	15%	17%
	Great effort	0%	0%	0%
	Only with help from others	0%	1%	1%
How long can you walk without having to take a break to rest?	Max. 5 min.	5%	2%	3%
	Max. 15 min.	7%	10%	9%
	More than 15 min.	88%	88%	88%
Satisfaction life	Low (1-6)	14%	5%	8%
	Average (7-8)	56%	69%	65%
	Good (9-10)	30%	26%	27%

Characteristic	**Categories**	**Rental (47 resp.)**	**Owner-occupied (88 resp.)**	**% Sample (X resp.)**
Home rating	Very bad	2%	0%	1%
	Bad	9%	1%	4%
	Neutral	12%	8%	9%
	Good	63%	57%	59%
	Very Good	14%	34%	27%
Facilities rating	Very bad	0%	1%	1%
	Bad	7%	2%	4%
	Neutral	14%	9%	11%
	Good	63%	70%	68%
	Very Good	16%	17%	17%
Social cohesion rating	Very bad	2%	0%	1%
	Bad	12%	6%	8%
	Neutral	26%	31%	29%
	Good	51%	55%	53%
	Very Good	9%	9%	9%
Current type of home	Single-family house with garden	58%	74%	69%
	Single-family house (no garden)	0%	1%	1%
	Apartment (same level)	21%	9%	13%
	Apartment not at floor-level	14%	7%	9%
	Other	7%	9%	8%
Size of dwelling	60-70 m2	21%	6%	11%
	70-80 m2	28%	7%	14%
	80-90 m2	19%	14%	15%
	90 m2 or larger	33%	74%	60%
Current rental price / mortgage each month	400 euros or lower	0%	45%	31%
	400 euro - 500 euro per month	2%	16%	11%
	500 euro - 600 euro per month	9%	10%	10%
	600 euro - 700 euro per month	30%	10%	17%
	700 euro - 800 euro per month	30%	8%	15%

	Higher than 800 per month	28%	10%	16%
Rental allowance	Yes No	23% 77%	n/a n/a	23% 77%
Travel time to facilities	0-5 minutes 5-10 minutes 10-15 minutes Longer than 15 minutes	16% 30% 30% 23%	20% 44% 23% 13%	19% 40% 25% 16%
Green walking route nearby home	No Yes, but it is not well accessible Yes, and it is well accessible	11% 6% 83%	20% 8% 72%	17% 7% 76%
Current time of residence in home	0-5 years 5-10 years More than 10 years	14% 12% 74%	17% 9% 80%	14% 8% 78%
Plan to relocate in coming 5 years?	Definitely not Possibly, perhaps Would like to, can't find anything Definitely	37% 35% 21% 7%	48% 44% 5% 3%	44% 41% 10% 5%
What is the most important reason for you to relocate?	Location with better facilities Single-floor apartment Relocate to a smaller home Other reason	18% 44% 15% 23%	11% 38% 31% 21%	13% 40% 25% 22%